Electronic Payment Mechanism Developments & implementation in Pakistan.

By
Kamran Khalid.

ACKNOWLEDGEMENT

Thanks to Allah Almighty Who provided me courage, knowledge and determination to complete this research report.

I would like to take this opportunity to express my gratitude to my supervisor Mr. Hammad Ashraf for encouraging me to take this initiative. I am also grateful to him for the guidance and support that he has extended to me. His consideration, advice and his guidance to understand various topics involved, made my task easier and feasible. I also acknowledge immense help provided by Dr. Ali Sajid , Mr. Wasique Waheed and Dr. Nadeem Haq for their considerable insights in making this report.

Dedication

I dedicate this research work to my parents, brothers, sisters and friends who always encouraged me and supported me to complete this research work.

Table of Contents

Executive Summary

Electronic Cash or Ecash and other Internet based electronic payment mechanisms provide enormous opportunity to cut down costs of financial industry. However, the evolutionary stage of their development is so rapid that it provides opportunity as well as risks. In the world there are more than one hundred electronic payment mechanism available with none so successful that it can be adopted like conventional currency notes and coins. Electronic payment developments in the world gave rise to a new field in the financial industry i.e. e- finance. That is rapid information technology developments and good information and communications technology infrastructure in the developed countries forced financial institutions and customers all over the world to enter the world of electronic finance.

Developing nations where low Internet bandwidth, week information and communications technology infrastructure and scarce awareness of the electronic facility to financial services are big question marks, future of the electronic financial industry is prone to many risks. Recent encouraging trends in the adoption of the electronic means of payment in developing countries although show a good sign but the usage of electronic payment is no more than credit and debit card transactions.

The study reveals that the risk associated with the electronic payment mechanism is also due to the lack of regulatory framework for electronic financial transactions and the role of respective governments of each country. In Pakistan electronic payment mechanism

developments and implementation are not more than debit and credit card transactions at the consumer end.

Organization of the Study

Chapter 1 and 2 along with annexure2 covers the basic literature review of the study. Chapter1 covers the introduction to the history of money and banking and provides and overview of evolution of fiat money and need of modern banking. Glyn Davies published work has been sought as reference for the historical evidence, and provide an insight to the introduction of the topic. Chapter1 covers the history and introduction till the electronic payment system emerged. Chapter 2 covers the electronic payment mechanism developments in the world. A detail list of payments systems available in the world is studied and a brief overview is given in it from case study on development of PayMe protocol. Since the purpose of the study is to understand the electronic payment mechanisms and developments in this regard with focus on overall financial industry therefore list of payment systems has been attached and the basic mechanism of most of the systems has been discussed in the study. Chapter2 covers the study of Mondex the first ever electronic payments mechanism and then E-Cash and Digi Cash with SET technology has been discussed.

Recent trends and prospects in financial industry have been discussed in Chapter 3. It covers findings and analysis on issues involved in overall electronic financial industry and role of payment mechanisms. Issues regarding connectivity, migration, and internet penetration have been discussed in detail in context of the effect on overall industry of the world.

Policy and regulatory issues have been discussed in Chapter4. It covers findings on infrastructure, privacy, security risks involved, and role of government, development and enforcement of standards. Developments and implementation with respect to Pakistan and efforts made by SBP and the banks in Pakistan have been discussed in detail in chapter 5 followed by a brief conclusion of the study.

Research Objective

The research has been conducted;

–To explore the e-payment developments in word and implementation in Pakistan, with user-to-user perspective not with B2B focus.

–Focus on issues involved, and impact on overall financial industry of the world.

–Exploring reasons why certain areas like e-Government still not benefiting from existing systems.

Research Question

Why there is no Standard Electronic Payment mechanism prevailing in the world, are developments on the subject were more focused on online shopping industry?

Research Methodology

Research has been carried out through various Internet journals on e-commerce, various URLs of organizations like World Bank and Bank of International Settlements. Research papers on topic have also been studied. Details on different mechanism have been studied through electronic payment systems observatory database. To understand the technical terminologies involved guidance of the supervisor has been sought.

Limitations of the study

Since most of the research on the topic is available on the web therefore material is collected mostly from Internet based research. Also there is no such detailed research available in Pakistan on the topic. However, efforts have been made to study news articles to get the status of developments on the research topic. It was not possible to cover all payment mechanisms however to narrow down the research to achieve objectives few basic payment mechanisms have been discussed.

ACKNOWLEDGEMENT

Thanks to Allah Almighty Who provided me courage, knowledge and determination to complete this research report.

I would like to take this opportunity to express my gratitude to my supervisor Mr. Hammad Ashraf for encouraging me to take this initiative. I am also grateful to him for the guidance and support that he has extended to me. His consideration, advice and his guidance to understand various topics involved, made my task easier and feasible. I also acknowledge immense help provided by Dr. Ali Sajid , Mr. Wasique Waheed and Dr. Nadeem Haq for their considerable insights in making this report.

Dedication

I dedicate this research work to my parents, brothers, sisters and friends who always encouraged me and supported me to complete this research work.

Table of Contents

Executive Summary

Electronic Cash or Ecash and other Internet based electronic payment mechanisms provide enormous opportunity to cut down costs of financial industry. However, the evolutionary stage of their development is so rapid that it provides opportunity as well as risks. In the world there are more than one hundred electronic payment mechanism available with none so successful that it can be adopted like conventional currency notes and coins. Electronic payment developments in the world gave rise to a new field in the financial industry i.e. e- finance. That is rapid information technology developments and good information and communications technology infrastructure in the developed countries forced financial institutions and customers all over the world to enter the world of electronic finance.

Developing nations where low Internet bandwidth, week information and communications technology infrastructure and scarce awareness of the electronic facility to financial services are big question marks, future of the electronic financial industry is prone to many risks. Recent encouraging trends in the adoption of the electronic means of payment in developing countries although show a good sign but the usage of electronic payment is no more than credit and debit card transactions.

The study reveals that the risk associated with the electronic payment mechanism is also due to the lack of regulatory framework for electronic financial transactions and the role of respective governments of each country. In Pakistan electronic payment mechanism developments and implementation are not more than debit and credit card transactions at the consumer end.

Organization of the Study

Chapter 1 and 2 along with annexure2 covers the basic literature review of the study. Chapter1 covers the introduction to the history of money and banking and provides and overview of evolution of fiat money and need of modern banking. Glyn Davies published work has been sought as reference for the historical evidence, and provide an insight to the introduction of the topic. Chapter1 covers the history and introduction till the electronic payment system emerged. Chapter 2 covers the electronic payment mechanism developments in the world. A detail list of payments systems available in the world is studied and a brief overview is given in it from case study on development of PayMe protocol. Since the purpose of the study is to understand the electronic payment mechanisms and developments in this regard with focus on overall financial industry therefore list of payment systems has been attached and the basic mechanism of most of the systems has been discussed in the study. Chapter2 covers the study of Mondex the first ever electronic payments mechanism and then E-Cash and Digi Cash with SET technology has been discussed.

Recent trends and prospects in financial industry have been discussed in Chapter 3. It covers findings and analysis on issues involved in overall electronic financial industry and role of payment mechanisms. Issues regarding connectivity, migration, and internet penetration have been discussed in detail in context of the effect on overall industry of the world.

Policy and regulatory issues have been discussed in Chapter4. It covers findings on infrastructure, privacy, security risks involved, and role of government, development and enforcement of standards. Developments and implementation with respect to Pakistan and efforts made by SBP and the banks in Pakistan have been discussed in detail in chapter 5 followed by a brief conclusion of the study.

Research Objective

The research has been conducted;

–To explore the e-payment developments in word and implementation in Pakistan, with user-to-user perspective not with B2B focus.

–Focus on issues involved, and impact on overall financial industry of the world.

–Exploring reasons why certain areas like e-Government still not benefiting from existing systems.

Research Question

Why there is no Standard Electronic Payment mechanism prevailing in the world, are developments on the subject were more focused on online shopping industry?

Research Methodology

Research has been carried out through various Internet journals on e-commerce, various URLs of organizations like World Bank and Bank of International Settlements. Research papers on topic have also been studied. Details on different mechanism have been studied through electronic payment systems observatory database. To understand the technical terminologies involved guidance of the supervisor has been sought.

Limitations of the study

Since most of the research on the topic is available on the web therefore material is collected mostly from Internet based research. Also there is no such detailed research available in Pakistan on the topic. However, efforts have been made to study news articles to get the status of developments on the research topic. It was not possible to cover all payment mechanisms however to narrow down the research to achieve objectives few basic payment mechanisms have been discussed.

Chapter 1:

Introduction to History of Money and Banking

When we ask what money is? At first sight the answer to this question seems obvious; the man or woman in the street would agree on coins and banknotes, but would they accept them from any country? What about cheques? They would probably be less willing to accept them than their own country's coins and notes but bank money (i.e. anything for which you can write a cheque) actually accounts for by far the greatest proportion by value of the total supply of money. The gold standard belongs to history but even today in many rich people in different parts of the world would rather keep some of their wealth in the form of gold than in official, inflation-prone currencies. The attractiveness of gold, from an aesthetic point of view, and its resistance to corrosion is two of the properties which led to its use for monetary transactions for thousands of years. In complete contrast, a form of money with virtually no tangible properties whatsoever - electronic money - seems set to gain rapidly in popularity.

All sorts of things have been used as money at different times in different places. The alphabetical list below, taken from page 27 of *A History of Money by Glyn Davies*, includes but a minute proportion of the enormous variety of primitive moneys, and none of the modern forms.

Amber, beads, cowries, drums, eggs, feathers, gongs, hoes, ivory, jade, kettles, leather, mats, nails, oxen, pigs, quartz, rice, salt, thimbles, umiacs, vodka, wampum, yarns, and zappozats (decorated axes).

1.1 Functions of Money

It is almost impossible to define money in terms of its physical form or properties since these are so diverse. Therefore any definition must be based on its functions. Specific functions (mostly micro-economic) [1] are;

1. Unit of account (abstract)
2. Common measure of value (abstract)
3. Medium of exchange (concrete)
4. Means of payment (concrete)
5. Standard for deferred payments (abstract)
6. Store of value (concrete)

General functions (mostly macro-economic and abstract) [2] are;

7. Liquid asset
8. Framework of the market allocative system (prices)
9. A causative factor in the economy
10. Controller of the economy

Not everything used as money as all the functions listed above. Furthermore the functions of any particular form of money may change over time. As Glyn Davies points out on page 28:

What is now the prime or main function in a particular community or country may not have been the first or original function in time, while what may well have been a secondary or derived function in one place may have been in some other region the original which gave rise to a related secondary function... The logical listing of functions in the table therefore implies no priority in either time or importance, for those which may be both first and foremost reflect only their particular time and place.

He goes on to conclude from this that the best definition is as follows:

"Money is anything that is widely used for making payments and accounting for debts and credits"**.**

[1, 2] Glyn Davies, Functions of Money from page 27 of *A History of Money*.

1.2 Causes of the Development of Money

In preface of "*A History of Money" by* the Glyn Davies, he writes:

"Money originated very largely from non-economic causes: From tribute as well as from trade, from blood-money and bride-money as well as from barter, from ceremonial and religious rites as well as from commerce, from ostentatious ornamentation as well as from acting as the common drudge between economic men."

One of the most important improvements over the simplest forms of early barter was the tendency to select one or two items in preference to others so that the preferred items became partly accepted because of their qualities in acting as media of exchange. Commodities were chosen as preferred barter items for a number of reasons - some because they were conveniently and easily stored, some because they had high value densities and were easily portable, and some because they were durable. These commodities, being widely desired, would be easy to exchange for others and therefore they came to be accepted as money.

To the extent that the disadvantages of barter provided an impetus for the development of money that impetus was purely economic but archaeological, literary and linguistic evidence of the ancient world, and the tangible evidence of actual types of primitive money from many countries demonstrate that barter was ***not*** the main factor in the origins and earliest development of money.

Many societies had laws requiring compensation in some form for crimes of violence, instead of the Old Testament approach of "an eye for an eye". According to Glyn Davies the word to *"pay"* is derived from the Latin *"pacare"* meaning originally to pacify, appease, or make peace with - through the appropriate unit of value customarily acceptable to both sides. A similarly widespread custom was payment for brides in order to compensate the head of the family for the loss of a daughter's services. Rulers have since very ancient times imposed taxes on or exacted tribute from their subjects. Religious obligations might also entail payment of tribute or sacrifices of some kind.

Thus in many societies there was a requirement for a means of payment for blood-money, bride-money, tax or tribute and this gave a great impetus to the spread of money.

Objects originally accepted for one purpose were often found to be useful for other non-economic purposes and, because of their growing acceptability began to be used for general trading also, supplementing or replacing barter.

Thus the use of money evolved out of deeply rooted customs; the clumsiness of barter provided an economic impulse but that was not the primary factor. It evolved independently in different parts of the world. About the only civilization that functioned without money was that of the Incas.

1.3 Primitive Forms of Money

The use of primitive forms of money in the Third World and North America is more recent and better documented than in Europe and its study sheds light on the probable origins of modern money. Among the topics treated are the use of wampum and the custom of the potlatch or competitive gift exchange in North America, disc-shaped stones in Yap, cowrie shells over much of Africa and Asia, cattle, manillas and whales teeth.

Manillas were ornamental metallic objects worn as jewelry in West Africa and used as money as recently as 1949. They were an ostentatious form of ornamentation, their value in that role being a prime reason for their acceptability as money. Wampum's use as money in North America undoubtedly came about as an extension of its desirability for ornamentation. Precious metals have had ornamental uses throughout history and that could be one reason why they were adopted for use as money in many ancient societies and civilizations.

The potlatch ceremonies of Native Americans were a form of barter that had social and ceremonial functions that were at least as important as its economic functions. Consequently when the potlatch was outlawed in Canada (by an act that was later repealed) some of the most powerful work incentives were removed - to the detriment of the younger sections of the Indian communities. This form of barter was not unique to

North America. Glyn Davies points out that the most celebrated example of competitive gift exchange was the encounter, around 950 BC, of Solomon and the Queen of Sheba. "Extravagant ostentation, the attempt to outdo each other in the splendor of the exchanges, and above all, the obligations of reciprocity, were just as typical in this celebrated encounter, though at a fittingly princely level, as with the more mundane types of barter in other parts of the world." (Glyn Davies, Functions of Money from page 27 of *A History of Money*,page 13).

Cattle are described by the Glyn Davies as mankind's "first working capital asset" (page 41). The religious use of cattle for sacrifices probably preceded their adoption for more general monetary purposes. For sacrifice quality - "without spot or blemish" - was important but for monetary purposes quantity was of more significance since cattle, like coins, can be counted. Obviously there were very practical reasons for the association between cattle and wealth but anthropological evidence from Africa in very recent times shows that when cattle are regarded as a form of money, not only healthy cattle but also scrawny ones will be valued to the detriment of the environment supporting them and their owners.

Glyn Davies quotes linguistic evidence to show how ancient and widespread the association between cattle and money was. The English words *"capital", "chattels"* and *"cattle"* have a common root. Similarly *"pecuniary"* comes from the Latin word for cattle *"pecus"* while in Welsh the word *"da"* used as an adjective means *"good"* but used as a noun means both *"cattle"* and *"goods"*.

He also points out that until well into the present century the Kirghiz of the Russian steppes used horses as their main monetary unit with sheep as a subsidiary unit. Small change was given in lambskins.

1.4 The Invention of Banking and Coinage

The invention of banking preceded that of coinage. Banking originated in Ancient Mesopotamia where the royal palaces and temples provided secure places for the safe-keeping of grain and other commodities. Receipts came to be used for transfers not only

to the original depositors but also to third parties. Eventually private houses in Mesopotamia also got involved in these banking operations and laws regulating them were included in the code of Hammurabi.

In Egypt too the centralization of harvests in state warehouses also led to the development of a system of banking. Written orders for the withdrawal of separate lots of grain by owners whose crops had been deposited there for safety and convenience, or which had been compulsorily deposited to the credit of the king, soon became used as a more general method of payment of debts to other persons including tax gatherers, priests and traders. Even after the introduction of coinage these Egyptian grain banks served to reduce the need for precious metals which tended to be reserved for foreign purchases, particularly in connection with military activities.

Precious metals, in weighed quantities, were a common form of money in ancient times. The transition to quantities that could be counted rather than weighed came gradually. On page 29 of *A History of Money* Glyn Davies points out that the words *"spend"*, *"expenditure"*, and *"pound"* (as in the main British monetary unit) all come from the Latin *"expendere"* meaning *"to weigh"*. On page 74 the author points out that the basic unit of weight in the Greek speaking world was the *"drachma"* or *"handful"* of grain, but the precise weight taken to represent this varied considerably, for example from less than 3 grams in Corinth to more than 6 grams in Aegina. Throughout much of the ancient world the basic unit of money was the *stater*, meaning literally *"balancer"* or *"weigher"*. The *talent* is a monetary unit with which we are familiar with from the Parable of the Talents in the Bible. The talent was also a Greek unit of weight, about 60 pounds.

Many primitive forms of money were counted just like coins. Cowrie shells, obtained from some islands in the Indian Ocean, were a very widely used primitive form of money - in fact they were still in use in some parts of the world (such as Nigeria) within living memory. "So important a role did the cowrie play as money in ancient China that its pictograph was adopted in their written language for *'money'*." Thus it is not surprising that among the earliest countable metallic money or "coins" were "cowries" made of bronze or copper, in China.

In addition to these metal "cowries" the Chinese also produced "coins" in the form of other objects that had long been accepted in their society as money e.g. spades, hoes, and knives. Although there is some dispute over exactly when these developments first took place, the Chinese tool currencies were in general use at about the same time as the earliest European coins and there have been claims that their origins may have been much earlier, possibly as early as the end of the second millennium BC. The use of tool coins developed (presumably independently) in the West. The ancient Greeks used iron nails as coins, while Julius Caesar regarded the fact that the ancient Britons used sword blades as coins as a sign of their backwardness. (However the Britons did also mint true coins before they were conquered by the Romans).

True coinage developed in Asia Minor as a result of the practice of the Lydians, of stamping small round pieces of precious metals as a guarantee of their purity. Later, when their metallurgical skills improved and these pieces became more regular in form and weight the seals served as a symbol of both purity and weight. The use of coins spread quickly from Lydia to Ionia, mainland Greece, and Persia.

1.5 Money Exchange and Credit Transfer

The great variety of coinages originally in use in the Hellenic world meant that money changing was the earliest and most common form of Greek banking. Usually the money changers would carry out their business in or around temples and other public buildings, setting up their trapezium-shaped tables (which usually carried a series of lines and squares for assisting calculations), from which the Greek bankers, the *trapezitai* derived their name, much as our name for *bank* comes from the Italian *banca* for bench or *counter*. The close association between banking, money changing and temples is best known to us from the episode of Christ's overturning the tables in the Temple of Jerusalem *(Matthew 21.12).*

Money changing was not the only form of banking. One of the most important services was *bottomry* or lending to finance the carriage of freight by ships. Other business enterprises supported by the Greek bankers included mining and construction of public buildings. The most famous and richest of all was Pasion who started his banking career

in 394 BC as a slave in the service of two leading Athenian bankers and rose to eclipse his masters, gaining in the process not only his freedom but also Athenian citizenship. In addition to his banking business he owned the largest shield factory in Greece and also conducted a hiring business lending domestic articles such as clothes, blankets, silver bowls etc. for a lucrative fee.

When Egypt fell under the rule of a Greek dynasty, the Ptolemies (323-30 BC) the old system of warehouse banking reached a new level of sophistication. The numerous scattered government granaries were transformed into a network of grain banks with what amounted to a central bank in Alexandria where the main accounts from all the state granary banks were recorded. This banking network functioned as a *giro* system in which payments were effected by transfer from one account to another without money passing. As double entry booking had not been invented credit transfers were recorded by varying the case endings of the names involved, credit entries being in the genitive or possessive case and debit entries in the dative case.

Credit transfer was also a characteristic feature of the services provided in Delos which rose to prominence in banking during the late second and third centuries BC. As a barren offshore island its inhabitants had to live off their wits and make the most of their two great assets - the island's magnificent natural harbour and the famous temple of Apollo - around which their trading and financial activities developed. Whereas in Athens banking, in its early days, had been carried on exclusively in cash, in Delos cash transactions were replaced by real credit receipts and payments made on simple instructions with accounts kept for each client.

The main commercial rivals of Delos, Carthage and Corinth, were both destroyed by Rome and consequently it was natural that the Bank of Delos should become the model most closely imitated by the banks of Rome. However their importance was limited by the Roman preference for cash transactions with coins. Whereas the Babylonians had developed their banking to a sophisticated degree because their banks had to carry out the monetary functions of coinage (since coins had not been invented), and the Ptolemaic Egyptians segregated their limited coinage system from their state banking system to

economise on the use of precious metals, the Romans preferred coins for many kinds of services which ancient (and modern) banks normally provided. After the fall of the Roman Empire banking was forgotten and had to be re-invented much later.

Banking re-emerged in Europe at about the time of the Crusades. In Italian city states such as Rome, Venice and Genoa, and in the fairs of medieval France, the need to transfer sums of money for trading purposes led to the development of financial services including *bills of exchange*. Although it is possible that such bills had been used by the Arabs in the eighth century and the Jews in the tenth, the first for which definite evidence exists was a contract issued in Genoa in 1156 to enable two brothers who had borrowed 115 Genoese pounds to reimburse the bank's agents in Constantinople by paying them 460 bezants one month after their arrival.

The Crusades gave a great stimulus to banking because payments for supplies, equipment, allies, ransoms etc. required safe and speedy means of transferring vast resources of cash. Consequently the Knights of the Temple and the Hospitallers began to provide some banking services such as those already being developed in some of the Italian city states.

1.6 Paper Money

In China the issue of paper money became common from about AD 960 onwards but there had been occasional issues long before that. A motive for one such early issue, in the reign of Emperor Hien Tsung 806-821, was a shortage of copper for making coins. A drain of currency from China, partly to buy off potential invaders from the north, led to greater reliance on paper money with the result that by 1020 the quantity issued was excessive, causing inflation. In subsequent centuries there were several episodes of hyperinflation and after about 1455, after well over 500 years of using paper money, China abandoned it.

1.7 Bills of Exchange

With the revival of banking in Western Europe, stimulated by the Crusades, written instructions in the form of bills of exchange came to be used as a means of transferring

large sums of money and the Knights Templar and Hospitallers functioned as bankers. (It is possible that the Arabs may have used bills of exchange at a much earlier date, perhaps as early as the eighth century). The use of paper as currency came much later.

1.8 Goldsmith Bankers

During the English Civil War, 1642-1651, the goldsmith's safes were secure places for the deposit of jewels, bullion and coins. Instructions to goldsmiths to pay money to another customer subsequently developed into the *cheque* (or *check* in American spelling). Similarly goldsmiths' receipts were used not only for withdrawing deposits but also as evidence of ability to pay and by about 1660 these had developed into the *banknote*.

1.9 Gold Standard

Although paper money obviously had no intrinsic value its acceptability originally depended on its being backed by some commodity, normally precious metals. During the Napoleonic Wars convertibility of Bank of England notes was suspended and there was some inflation which, although quite mild compared to that which has occurred in other wars, was worrying to contemporary observers who were used to stable prices and, in accordance with the recommendations of an official enquiry Britain adopted the gold standard for the pound in 1816. For centuries earlier silver had been the standard of value. The pound was originally an amount of silver weighing a pound. France and the United States were in favour of a bimetallic standard and in 1867 an international conference was held in Paris to try and widen the area of common currencies based on coins with standard weights of gold and silver. However when the various German states merged into a single country in 1871 they chose the gold standard. The Scandinavian countries adopted the gold standard shortly afterwards. France made the switch from bimetallism to gold in 1878 and Japan, which had been on a silver standard, changed in 1897. Finally, in 1900, the United States officially adopted the gold standard.

With the outbreak of the First World War in 1914 Britain decided to withdraw gold from internal circulation and other countries also broke the link with gold. Germany returned

to the gold standard in 1924 when it introduced a new currency, the Reichsmark and Britain did the following year, and France in 1928. However the British government had fixed the value of sterling at an unsustainably high rate and in the worldwide economic crisis in 1931 Britain, followed by most of the Commonwealth (except Canada) Ireland, Scandinavia, Iraq, Portugal, Thailand, and some South American countries abandoned gold.

The United States kept the link to gold and after the Second World War the US dollar replaced the pound sterling as the key global currency. Other countries fixed their exchange rates against the dollar, the value of which remained defined in terms of gold. In the early 1970s the system of fixed exchange rates started to break down as a result of growing international inflation and the United States abandoned the link with gold in 1973.

1.10 Intangible Money

The break with precious metals helped to make money a more elusive entity. Another trend in the same direction is the growing interest in forms of electronic money from the 1990s onwards. In some ways e-money is a logical evolution from the wire transfers that came about with the widespread adoption of the telegraph in the 19th century but such transfers had relatively little impact on the everyday shopper.

The evolution of money has not stopped. Securitization, the turning of illiquid assets into cash, developed in new directions in the 1990s. One much publicized development was the invention of bonds backed by intangible assets such as copyright of music, e.g. Bowie bonds, named after those issued by the pop star David Bowie. (See also Something Wild, the first novel dealing with Bowie bonds).

1.11 Noteworthy Points Regarding the Origins of Money

Some of the points regarding origins of money are:-

- Money did not have a single origin but developed independently in many different parts of the world.

- Many factors contributed to its development and if evidence of what anthropologists have learned about primitive money is anything to go by economic factors were not the most important.
- Money performs a variety of functions and the functions performed by the earliest types were probably fairly restricted initially and would NOT necessarily have been the same in all societies.
- Money is fungible: there is a tendency for older forms to take on new roles and for new forms to be developed which take on old roles, e.g. (this is my example) on English banknotes such as the 5 pound notes it says "I promise to pay the bearer on demand the sum of five pounds" and below that it carries the signature of the chief cashier of the Bank of England. This is a reminder that originally banknotes were regarded in Britain, and in many other countries, as a substitute for money and only later did they come to be accepted as the real thing.

For most of recorded history money has meant coins. However, banking was invented well over a thousand years before coins and China abandoned paper money in favor of coins just as Europe was turning to paper. Today intangible forms of money ranging from e-money to Bowie bonds are becoming important.

According to Glyn Davies opinion economists, especially monetarists, tend to overestimate the purely economic, narrow and technical functions of money and have placed insufficient emphasis on its wider social, institutional and psychological aspects.

These issues aren't simply of academic interest. Economists still argue about how to measure and control the money supply and numerous different measures, corresponding to slightly different definitions have been proposed. These disputes have implications for the material well-being of everyone, especially now that thanks to the development of computer networks, new forms of money are coming into existence.

Chapter 2:

Electronic Payment System Developments in the World

According to Financial Sector of the World Bank Group the payments systems in most industrial countries include a variety of payment mechanisms to satisfy the unique needs of five market sectors; consumer, corporate, financial markets, government, and international for executing payments transactions. For example, cash is still used in all countries as the principal means of making low value payments at the point of sale. In addition to cash, credit and debit cards are often used for point of sale transactions. In many countries, checks are used as well. For bill payments, many countries also use the check or a paper giro system. Increasingly, electronic alternatives-such as direct debit, direct credit and paperless giro-are being employed to reduce the delays and costs associated with the physical movement and processing of paper transactions. Countries with high check volumes are capturing the payment information from the checks and electronically processing the payment data to speed clearing and reduce processing costs.

The World Bank is actively supporting the design, development, testing and implementation of comprehensive payments system reform initiatives in a variety of developing and transitional economies in all geographical regions, through a combination of technical assistance and lending operations. Table on next page shows providers of electronic finance in the world. A list of important electronic payment mechanisms developed so far is attached in annexure2 at the end.

Providers of Electronic Finance

Type of financial service	United States	Europe	Asia	Latin America
Online Banks	Telebanc Net.B@nk X Bank Wingspanbank	Egg Bank, Smile Advance Bank, Bank Girotel, Comdirect, Diba, Entrium, First E, Santander Augsburger Aktien-bank	OUB (Singapore, to be established) Dah Sing (Hong Kong, to be established)	Banco1
Online Lenders	E-LOAN Mortgage.com NextCard Finet Intuit/Quicken	EuropeLoan (Belgium)		
Aggregators	InsWeb AnswerFinancial Lending Tree Quotesmith.com Intuit/Quicken	InsuranceCity (Germany) Interhyp (Germany)	DollarDEX (Singapore, Hong Kong, soon in Malaysia, Taiwan, and China) Eisland.com (Singapore) Admortgage.com (Hong Kong) e-finance.com (Hong Kong)	Dineronet (Argentinia) Zonafinanciera
Online Brokers	Schwab.com E-Trade TD Waterhouse DU Directs Fidelity.com Ameritrade	Consors (Germany) Direct Anlage (Germany) Avanza (Sweden)	Boom Securities (Hong Kong) Polaris, Kong Chen, Masterlink (Taiwan, China) Daishin, LG Sec., Samsung Sec. (Korea)	Patagon (Argentina, Brazil, Chile, Mexico) Socopa Souza Barros, Novaca Hedging Griffo, Coin Valores (Brazil) CB Capitales (Chile)
Financial Portals	Yahoo!Finance Microsoft Network Intuit/Quicken America Online Motley Fool TheStreet.com	eXchange Holdings (UK) bfinance (France) FTYourMoney (UK)	Quamnet, Baby Boom, asiabondportal (Hong Kong) Quicken/SPH (Singapore) PaxNet, Thinkpool, Net Invest (Korea) 99stock.com, stockstar.com, homeway (China)	Investshop (Brazil) Patagon Dineronet (Argentina) Zonafinanciera LatinStocks LatinInvestor Consejero
Enablers	Security First (S1) Sanchez, Corrillian Digital Insight iXL Enterprises Online Resources Alltell, Bisys, Fiserv EDS, M&I, 724 Solutions		eBiz Solutions Finese Alliance I-ayala System Access The Edge Consult. S1 Singapore Ebx.com	
E-payments	CheckFree, Spectrum, CyberCash, Mondex, CyberSource, Entrust, Verisign, Intelidata, Sterling Commerce, DotsConnect, First Ecom		QSI (Australia) First Ecom (Hong Kong) V-check (Singapore)	

Source: Hussey and others 2000; country sources.

Electronic Finance: Reshaping the Financial Landscape Around the World

Source: p5, Stijn Claessens, Thomas Glaessner, and Daniela Klingebiel

For the sake of simplicity we will discuss here some important mechanisms developments which are being widely used starting from the origin i.e. of Mondex. Annexure 3 provides some significant Master Card projects around the world in emerging markets.

2.1 Mondex

Mondex was developed by the NatWest Group in 1990. The first trial using Mondex technology began in 1992 involving over 4,000 staff in London NatWest offices paying for purchases in staff restaurants and shops. The first public trial commenced in Swindon in 1995. Mondex International was subsequently formed in July 1996.

2.1.1 Members/parties

Since 1997 Mondex International Ltd. is a subsidiary of MasterCard International that owns 51% of the company. It is worth to distinguish Mondex International from the franchisees acting in different countries, and from the members licensed by the franchisee. The originator, who issues, controls and redeems electronic cash denominated in a given currency, is again a distinct actor. Of course merchants and cardholders have to be added. Originators, merchants and cardholders deal with the members. The parties involved differ considerably between countries. This can be shown giving three examples:

It is interesting to note that the company consists of two separate organizations: Mondex USA Services and Mondex USA Originator. In the United Kingdom Mondex UK Limited, consisting of HSBC Bank plc, National Westminster Bank Plc and National Australia Group is the franchisee, and the territory members are Midland Bank, National Westminster Bank, and Bank of Scotland. In June 2001, Mastercard announced its intention to assume full ownership of Mondex International.

2.1.2 Geographical scope

Mondex partners and trials can be found in all continents. Regarding Europe, the developments took place in France, Norway, the UK and Ireland. In France Banque Federative du Credit Mutuel launched a community pilot in Strasbourg, France. It is claimed to have issued more than 100.000 cards and to have more than 1.000 merchants accepting them. In Norway a pilot of a player card (and a payer card) has started with "the intention [is] to provide all of Norway's 1.8 million lottery players with the new card in 2001". The aim is ambitious: "The new card - with approval from the Norwegian Government - will make it possible to offer new games over the Internet via PCs, mobile phones and Digital TV. The same card can be used for both playing the games and buying products at the lottery commissioners' shops. It will also make it possible to shop with electronic cash via TVs, Internet and other digital channels" (Mondex Int.). In the United Kingdom Mondex is most visible in some Campus applications, namely the NatWest University Card at Exeter University (1998), HSBC Bank's University Card at the University of York (1996), the Aston University 'Smart Campus Card' (1997), and the University of Nottingham (with NatWest). In Ireland (Dublin) a multi-application Mondex smart card, called Citrus was launched in the Blanchards town Shopping Centre (2000).

2.1.3 Application Area

POS and virtual POS (Internet, digital TV); suitable for low and high values; applied in closed environments such as a university campus and as a generalised cash-like electronic payment method; the operating system MULTOS allows for multiple-applications (e.g. loyalty, ID card, access to libraries); cross-border interoperability is claimed. Mondex cards may come as pure e-purses or as a hybrid together with another payment card (e.g. as one option in the Sherbrooke pilot). Person to person transfers of e-money are possible, if a special device, the Mondex wallet, is at hand.

2.1.4 State of deployment

There was no national roll-out so far. But there are a series of pilots in open and closed environments underway. Some of the pilots, like those in Swindon, UK, Guelph (Ontario), Canada, the one in New York City's Upper West Side, and the one at the Edinburgh University were not continued. But new pilots were started such as the one in Strasbourg, France and Sherbrooke (Quebec), Canada. Other pilots address special purposes and communities. To give some examples: a pilot of the Norwegian State Lottery (a player card), a multi-application student's card in Lennoxville (Quebec), an ADSL trial with British Telecom, and a trial involving Webshack internet cafes and the SmartAxis service to pay for log-on-time and for purchases on the Internet using a Mondex card.

2.1.5 Description

To obtain a Mondex card the user has to register first with a member of Mondex linking the e-purse to his/her bank account. "Mondex electronic cash is digitally stored on a reload able and highly secure microprocessor computer chip. The chip is embedded in a plastic card that looks and feels similar to a debit or credit card. Though Mondex looks like any other plastic card, it acts similar to cash - thanks to its chip-to-chip transactions. Mondex value flows directly from one Mondex chip to another Mondex chip. No third-party intermediary clears or processes every transaction. Only the holders of the two Mondex chips are involved" (Mondex, US). Mondex can be transferred chip to chip using the Mondex wallet, over a telephone line, over the Internet or wireless.

It is worth noting that Mondex defines purse classes, defining which chips can transfer value to the others. For example, the originator chip can pass value directly to a bank chip, but not to a consumer chip. Likewise, merchants can transfer value to bank chips, but not with other merchants. This approach is a means of security and control. At the same time it makes clear that Mondex e-cash too does not freely circulate.

2.2 SET (Secure Electronic Transaction)

On 31st December,1996 first SET payment launched. In December 1997 foundation of SETCo (SET Secure Electronic Transaction LLC) took place.

2.2.1 Members/parties

SETCo is an organization established and supported by borrowed resources from MasterCard and Visa. The board of directors is composed of MasterCard International and Visa International. Additional members of SETCo are financial institutions classified as "Business Advisors Group", SET developers classified as "Technology Advisors Group", and merchants and vendors building the "SET Support Community".

2.2.2 Geographical scope /Application Area

Regions in which SET implementations and transactions are being conducted: Europe - 21 countries, Asia/Pacific - 9 countries (SETCo, March 2000). Application area includes Virtual POS in open networks.

2.2.3 State of deployment and Description:

SET is fully operational and it is used in several countries. The SET Secure Electronic Transaction protocol aims to become the common technical standard for the protection of payment card purchases over the Internet. SET adoption is driven by SETCo (see "Members/Parties" section)

2.2.4 Features of SET

- SET is basically a software based solution: Consumers are provided with "wallets", merchants with "cash registers", and the financial institutions involved with "payment gateway" software. Talking about a standard, the three components should work together, regardless of which vendors' software is used.

- All parties involved in SET transactions - customer, merchant, payment gateway - are provided with digital certificates that are authenticated by digital signatures, validating the identities of the participants.

- SET uses cryptography (combinations of DES and RSA cryptography). Important with respect to liability and anonymity is the "dual signatures" approach. The customer signs order instructions and payment instruction with a so called "dual signature". On the one hand this allows for recognizing related order data and payment data and on the other hand it guarantees that the merchant does not see the payment data and the payment service provider does not see the order information.

- The root Certificate Authority - SETCo - sits at the top of the hierarchy and is responsible for issuing digital certificates to the payment brands (e.g. Visa, MasterCard). By obtaining SET certificates from SETCo, the payment brands become Certificate Authorities and are entitled to issue SET certificates to their member banks. The member banks in turn become Certificate Authorities that can sign and issue SET certificates to their cardholders or merchants. They are responsible for ensuring the authenticity of the certificates and must confirm the identity of a certificate requester before issuing a certificate.

2.2.5 Steps of the payment process

Once a consumer has selected items for purchase from an Internet retailer's website and has been presented with an order form, the SET transaction process begins as follows:

1. The cardholder selects the 'Payment with SET' option and then chooses their form of payment e.g. Visa, MasterCard etc.

2. The merchant 'wakes up' the cardholder's SET wallet, which sends a message to the merchant indicating which payment card the consumer is using.

3. An exchange takes place between the merchant and cardholder, authenticating each party and encrypting the payment information. This encrypted data is then forwarded to the merchant, which sends it, still encrypted, to its bank for decryption and authorization.

4. The merchant bank (acquirer) authenticates all the parties in the transaction and processes the transaction with its normal authorization process.

5. If approved, the merchant ships the requested goods or provides the requested service and, in return, receives payment from its financial institution.

Most recent figures to be found on the SETCo site date from 1999 and are rather vague: Hundreds of merchants and many financial institutions across the US, Canada, Europe, Latin America and Asia are currently using SET. The number of SET users has increased by over 300 percent since 1998.

- Common criticisms: SET is not needed, is too expensive, will not interoperate between different IT systems, is too complex for merchants and consumers, no one uses it, SSL killed SET (find the answers of SETCo in a document referenced below).
- Developments in Europe, especially in France (--> C-SET and CyberComm), envisage the combination of smartcards and SET to secure transactions.
- To ease the use of SET for customers, server based wallets have been developed, i.e. all the actions performed originally by the wallet at the user's computer such as digitally signing messages and authenticating the user are done now at a remote server. Users only need to identify by a PIN or Password at the remote payment server.

- This conceptual shift is also reflected in the so called 3D model (three domain model) published in July 2000 by Europay and Visa that takes server based wallets in the European Union into account. By October 2001 acquiring banks

must certify that they can participate in the 3D model. Merchants authenticated within the 3D model will see their liability shifted to the card issuer for any fraudulent and disputed transactions.

2.3 ECash

In 1994 Digicash is founded and offers a coin-based network money called Ecash. In1998 Digicash files for bankruptcy, In 1999 eCash Technologies Inc. purchases Digicash's "blind signature" technology and other assets. eCash Technologies Inc. Partners include, inter alia, Deutsche Bank 24 and Sun Microsystems.

2.3.1 Geographical scope / Application Area

Used Nationwide in USA (but integrated in a payment product suite called Monneta). In the EU, Ecash is not issued anymore, after Bank Austria terminated it in Nov 1999 and Deutsche Bank announced termination in April 2001). Application area includes Virtual POS. Ecash started as a micro-payment solution but today the sums involved can be higher (up to DM400 or EUR200 with Deutsche Bank online shop).

2.3.2 State of deployment

From October 1995 to September 1998, the "Digicash" system involved 300 merchants and 5000 PC users. But the company filed for bankrupcy in November 1998.

Deutsche Bank had upgraded ecash and adapted the Ecash technology to the German market. After a successful eCash trial started in 1997, Deutsche Bank opened on February 1999 an Online Shop with 128-bit SSL-encrypted access security allowing for ecash micro payment and credit card payment (SSL-encrypted).

"Deutsche Bank 24" is an e-banking service in collaboration with eCash Technologies, where DB offers bank-account-based payments under the eCash brand. But on April 2001, it was announced that this service would stop its eCash activities.

2.3.3 Description

Ecash started as an anonymous coin (software)-based payment system for micro payment which allows users to send electronic payments from any PC to any other PC or workstation using any computer network, including the internet, using the so-called "blind signature".

eCash Technologies Inc. which positions itself as a company that markets e-payment solutions including Debit, Prepaid, P2P, Gift Certificate, Loyalty schemes and Mobile payment. Its "Monneta" product suite uses eCash payments to exchange funds. Therefore, there are two distinct aspects related to Ecash:

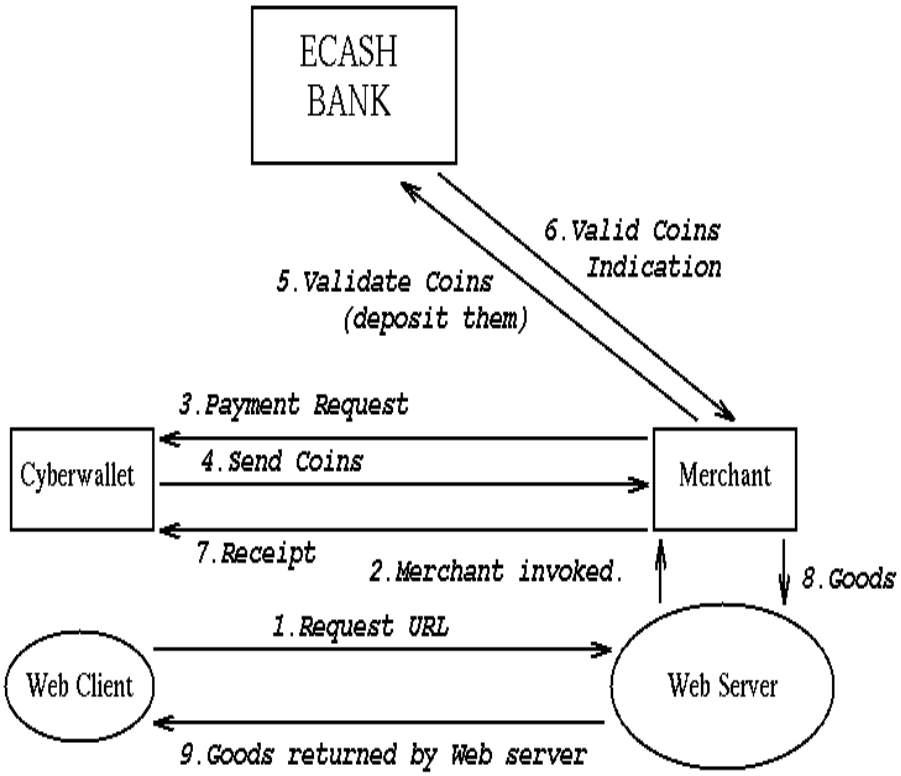
One is the software-based e-money invented in 1994 by Digicash and implemented in the Deutsche Bank Online Shop. The other one is the American company that bought Digicash assets in 1998 and today offers B2C and B2B e-payment solutions, and which works, inter alia, in partnership with Deutsche Bank 24.

2.4 Developing a mechanism (An overview of case study of PayMeProtocol Michael Peirce and Donal O'Mahony)

It is necessary to understand that how improvements in the existing mechanisms can be made and new mechanisms can be developed. The brief discussion on next page gives an overview of how a new mechanism developed by the authors Michael Peirce and Donal O'Mahony known as Pay Me Protocol. They discuss their strengths and weaknesses and propose a new system called the PayMe Transfer Protocol (PMTP). They have showed how it improves on existing systems, and illustrate its use with an example based on purchase of goods across the WWW. The two figures, Figure 1 and Figure 2 explains the Pay Me mechanism.

- The Ecash system consists of three main entities;
    - Banks that mint coins, validate existing coins and exchange real money for Ecash.

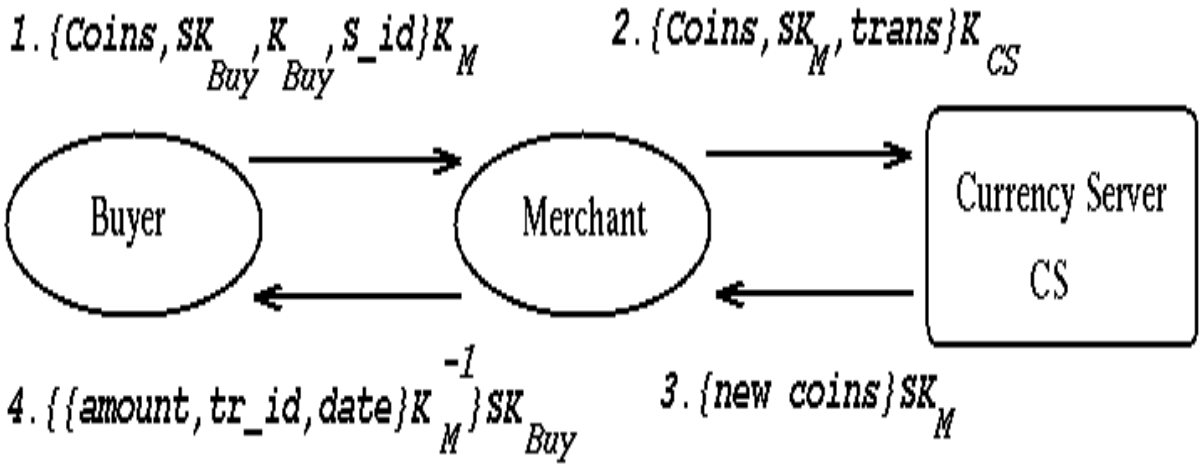
- Buyers who have accounts with a bank, from which they can withdraw and deposit Ecash coins.
- Merchants who can accept Ecash coins in payment for information, or hard goods. It is also possible for merchants to run a pay-out service where they can pay a client Ecash coins.



ıanageable.

- Task of maintaining and querying a database of spent coins is probably beyond today's state-of-the-art database systems.

- **Net Cash Features**
  - System consists of buyers, merchants, and currency servers.
  - Uses Public Key and Private Key cryptography.
  - Prevents double spending.
  - Scalable and secure.



- More Time consuming.
- Net Cash is not fully anonymous (does not keep of who received coins and to whom coins issued).

- **PayMe Protocol Development**
  - Combined advantages of Net Cash and E Cash.
  - PMTP was designed to provide secure communication.
  - Security steps were also taken to protect coins, the private cryptographic keys used, and the accounts at the bank.
  - The simple PMTP protocols can be used for inter-bank communication as well as with regular users.
    - No credit card numbers are used, since not all Internet users, for whatever reasons, hold valid credit cards.
    - Anyone who wants to can buy PayMe electronic coins and have an account at a PayMe on-line bank.
    - PayMe can be used with any Web client or server software and it is not limited to any specific product or HTTP version.
    - No special hardware, such as smart cards, is required to use PayMe.
    - The system can be used from online software.

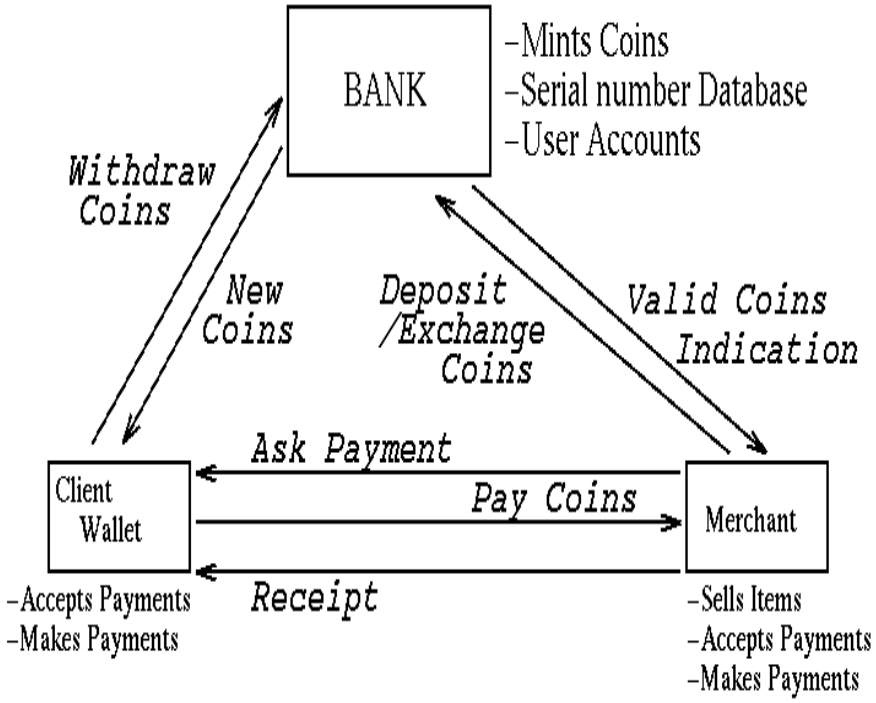


Figure1: Basic functionality of the PayMe system

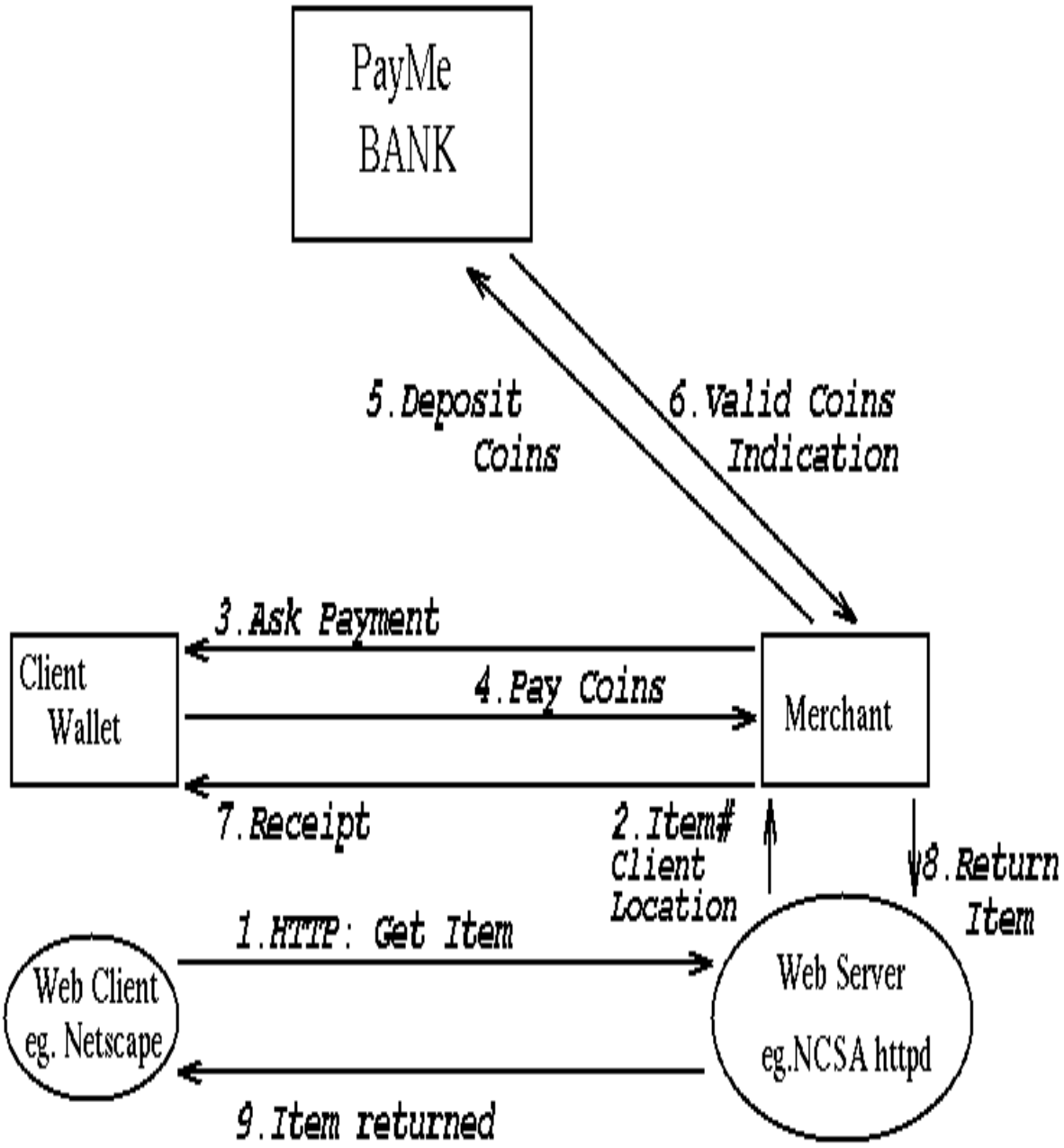


Figure2: Purchasing a Web service with PayMe

Chapter 3:

Recent Trends and Prospects in Financial Services

Although there has been some retrenchment in the technology sector, technology and Globalization continues to transform the production and delivery of financial services. Financial services are increasingly delivered electronically, though a number of factors appear to influence the penetration of e-finance and the ability of countries to realize its potential. How has e-finance evolved, and what effect is it having on incumbent financial institutions?

Through various channels—computers, cell phones, kiosks—e-finance is spreading around the globe, including to emerging markets. Although there is variation by market and region—in terms of the main medium used to deliver financial services, the types of services provided, and the rate of penetration—there are significant commonalities in the development of e-finance. That trend suggests that global convergence is possible. Large and growing overseas migration of trading and capital rising complements the rapid growth in electronic delivery channels. And around the world, connectivity is increasing.

3.1 E-finance penetration

There is significant variation, with differences not clearly related to each country's level of development. Using various sources, Table 2 shows the extent of electronic banking and brokerage services in key industrial and emerging markets. In some countries, industrial as well as developing, electronic delivery of financial services remains in its infancy.

Meanwhile, other countries have seen rapid penetration of e-finance. In Sweden e-finance accounts for more than one-third of financial transactions. In some emerging markets, such as the Czech Republic, Republic of Korea, and Mexico, e-finance penetration is also high for some financial services.

Despite institutional disadvantages (such as weaker telecommunications infrastructure) and more adverse demand and supply factors, Internet-based services are sometimes as

popular in emerging markets as in industrial countries—or even more popular. For example, online banking is nearly as widespread in Brazil as in the United States. This suggests that around the globe, e-finance is fairly easy to introduce and for customers to assimilate. It may also suggest that in countries with weak financial services, customers have a strong incentive to move to e-finance providers. Banking services may still be limited in these countries, but e-finance offers an opportunity to expand access. Although online-only banking has been less successful than was anticipated, with several online-only banks running into difficulty, incumbent banks are starting to offer financial services electronically.

The threat of new entrants has led many banks to offer e-finance ranging from basic to fully integrated Internet services. Speed and other factors influencing this shift vary by an institution's size and circumstances, but this trend has accelerated recently in the United States and Europe (Furst, Lang, and Nolle 2000; Salomon Smith Barney 1999, 2000). Thus customers of incumbent banks in other markets could soon migrate to complete e-finance as well.

About 28 percent of brokerage services are now provided online in industrial countries and in some emerging markets. This rapid acceptance of e-finance in securities markets partly reflects the technology-driven nature of these markets and the ease with which consumers can switch brokers.

The rapid spread also suggests that the technology of e-brokerage is easy to introduce and market to users, and that cost reductions are quickly being passed on to consumers.

Other e-payment products, such as e-money, have seen various penetration rates. In some countries (the Netherlands, Norway) penetration, as measured by the number of terminal units at which payments can be made by cards, is quite high (see Table 3.1). In these countries e-cards have complemented or replaced existing financial services. A stumbling block to greater penetration has been standards and to some extent security arrangements. Countries with more use tend to be smaller, suggesting that it has been easier to introduce standards for e-money. But in larger countries a lack of standards and critical mass has often not allowed stored-value cards to catch on. As standards are being set and security

arrangements enhanced, e-cards and other forms of e-payments are putting pressure on banks' income from payments services throughout the world.

3.2 Connectivity

Around the world, consumers and countries are increasingly getting connected. Advanced countries like the United States lead in terms of the percentage of the population that owns a personal computer and has Internet access (Table 3.2). The density of Internet services is also highest in the most advanced countries. This high connectivity is augmented by the popularity of mobile phones, which are used by almost two-thirds of the people in Finland and Norway and three-fifths in Sweden.

Connectivity generally declines with income, though there are exceptions. For example, Portugal has low computer ownership and Korea has high connectivity, including through mobile phones— yet the countries' per capita incomes are quite similar (Portugal $11,384 and Korea $9,878 in 1999).

In many countries connectivity has been increasing sharply in recent years. Between 1995 and 1998 the percentage of people owning a personal computer in selected industrial countries rose almost 60 percent. In a sample of developing countries the rise was 150 percent, albeit from a lower base[3]. These new technologies not only allow countries to leapfrog in connectivity, they also open new channels for delivering e-finance services.

3 The industrial countries were Australia, Denmark, Hong Kong (China), Japan, the United Kingdom, and the United States. The developing countries were Brazil, Chile, China, Guatemala, Hungary, India, Kenya, Mexico, Peru, Senegal, Sudan, Vietnam, and Zimbabwe

Table 3.1

E-finance penetration, end 1999

Income group/economy	Online banking (customers as percentage of bank customers)	Online brokerage (transactions as percentage of brokerage transactions)	E-money (number of merchant terminals per 100,000 people)	Business environment ranking, 2000–04
Industrial country average	**8.5**	**28**	**434**	**8.2**
Australia	4	22	10	8.1
Belgium	4	20		8.2
Denmark	6	38	1,192	8.4
Finland	20		110	8.2
France	2	18	1	8.2
Germany	12	32	73	8.3
Italy	1	16	7	7.7
Japan		32		7.4
Netherlands	15	40	1,898	8.8
Norway	8	25	1,059	8.0
Portugal	2	7	589	7.6
Spain	2	8	251	8.0
Sweden	31	55	418	8.3
United Kingdom	6	26	3	8.8
United States	6	56	35	8.7
Emerging market average	**4.9**	**27**	**27**	**7.0**
Argentina	3			7.2
Brazil	5	6	1	6.4
China		3		5.9
Czech Republic	1	90		7.0
Hong Kong, China	5	1	351	8.5
Hungary	6		1	7.1
India	11	2		6.0
Korea, Rep. of	13	65		7.3
Mexico	3	41	2	6.8
Poland	1			7.2
Singapore	5	10	332	8.6
Thailand	1		1	7.3
Average for all economies	**6.9**	**28**	**317**	**7.5**

Source: Data on online banking and online brokerage are from various sources, but mainly from DataMonitor and central banks. Data on e-money are from the Committee on Payment and Settlement Systems, Survey of Electronic Money Developments, 2000. Business environment rankings are from the Economist Intelligence Unit Country Forecast, with a score of 10 as best and 5 as poor. The rankings combine more than 70 indicators—including the strength of the economy, outlook for political stability, regulatory climate, taxation policy, and openness to trade and investment—to measure the expected attractiveness of the general business environment through 2004. See Annex 1 for further details.

Source: Bank of New York; see also Claessens, Klingebiel, and Schmukler 2001.

Table 3.2

Connectivity across countries, 1999

Income group/economy	Personal computer use (percentage of population owning personal computers)	Internet connectivity (Internet hosts per 10,000 people)	Mobile phone use (percentage of people who are mobile or cellular subscribers)
Industrial country average	**32**	**346**	**44**
Australia	47	417	34
Belgium	32	162	31
Denmark	41	72	49
Finland	36	1,057	65
France	22	83	36
Germany	30	161	29
Italy	19	59	53
Japan	29	133	45
Netherlands	36	357	44
Norway	45	715	62
Portugal	9	50	47
Spain	12	67	3
Sweden	45	488	58
United Kingdom	31	241	46
United States	52	1,123	31
Emerging market average	**9**	**40**	**16**
Argentina	5	18	12
Brazil	4	13	9
China	1	0	3
Czech Republic	11	72	19
Egypt	1	0	1
Hong Kong, China	29	120	63
Hungary	7	83	16
India	0	0	0
Korea, Rep. of	18	40	50
Mexico	4	12	8
Poland	6	28	10
Russia	4	10	1
Singapore	44	208	42
South Africa	6	34	12
Thailand	2	3	4
Turkey	3	5	13
Average for all economies	**20**	**188**	**30**

Source: International Telecommunication Union, World Telecommunications Indicators Database 1999. See Annex 1 for details.

Source: Bank of New York; see also Claessens, Klingebiel, and Schmukler 2001.

3.3 The potential and the impact of e-finance

The potential as noted, e-finance has been growing quickly many markets. This growth reflects expansion patterns of certain services and products with network externalities, such as telecommunications and some financial services (Furst, Lang, and 2000). Penetration tends to accelerate once it has reached critical mass. This critical mass—subsequent growth—is often similar across markets.

Most analysts expect e-finance to exhibit this pattern of market penetration (see ongoing analysis by Forester Research, Jupiter Research, and Data Monitor). So what determines when a country reaches critical mass of penetration? A variety of factors, including the quality of a country's telecommunications infrastructure, its approach regulation, and the demand for and supply of e-finance services (see CID 2000). It is too early fully explain the determinants of e-finance penetration. Nevertheless, in countries where e-finance penetration has reached a level that should lead to faster growth, the level of connectivity and the quality of the business environment appear to explain the point of takeoff. The projections indicate that by 2005 an average of 50 percent of banking services will be provided online in the industrial countries and 10 percent in the emerging markets—up from 8.5 percent and 1 percent in 2000. The change will be even more dramatic for online brokerage: from an average of 28 percent to 80 percent in the industrial countries and from 1.5 percent to 15 percent in the emerging markets.

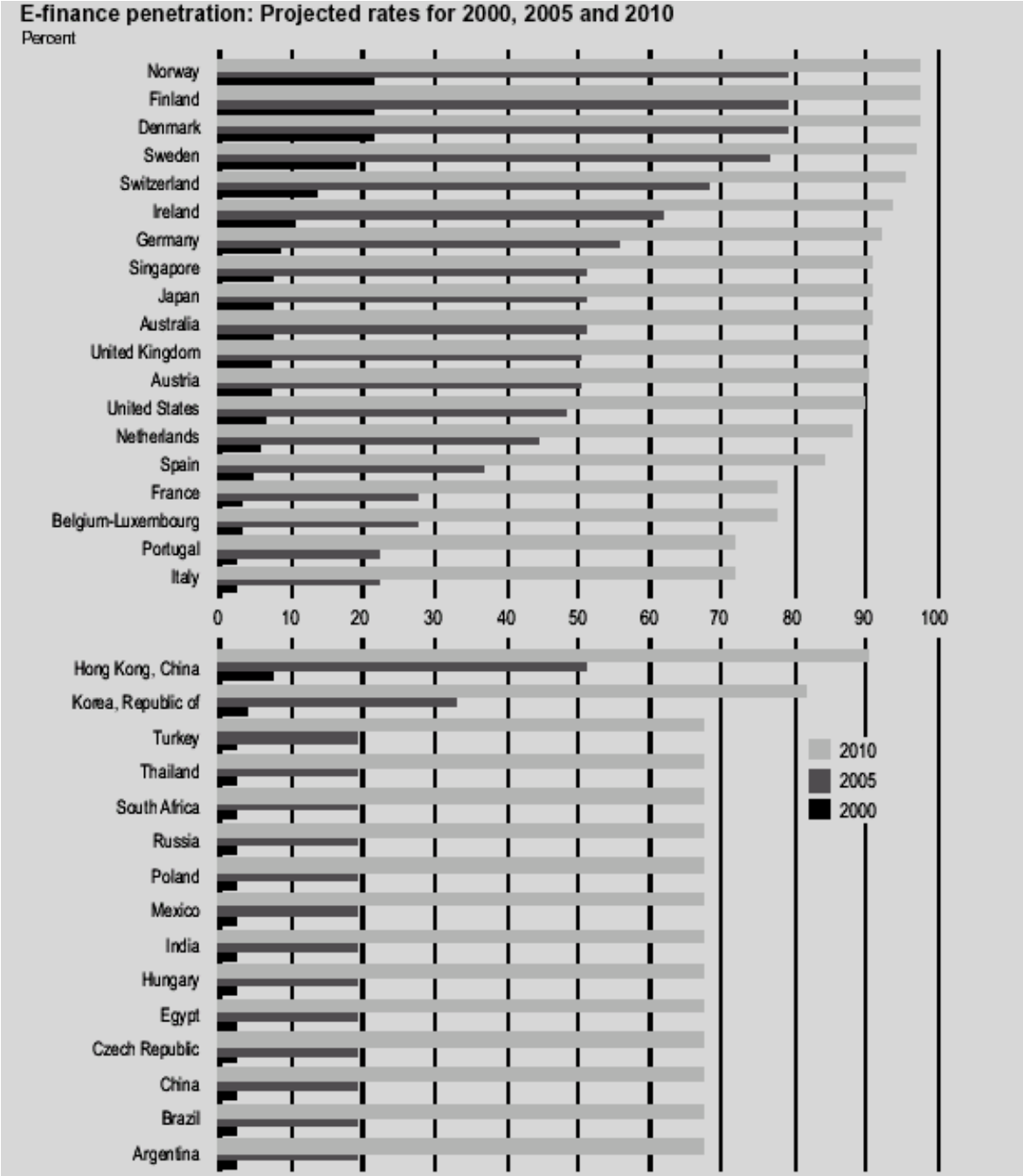
In Sweden online trading will jump from 55 percent to 94 percent. But in Italy penetration in banking will rise from just 1 percent 22 percent, because the country has not yet achieved critical mass in e-finance. But by 2010 it might, and e-banking penetration in Italy could exceed 70 percent.

E-finance penetration could grow even faster if the environment for it improves. Figure 2 shows the results of a simulation in which connectivity in all emerging markets rises to about the level of the lowest-ranked industrial country today—a rating of 6. This would imply that the penetration of online banking in most emerging markets could rise to about 20 percent in 2005, and brokerage services to about 40 percent. With a more conducive environment, e-finance penetration around the world could thus increase 6 fold in

banking, from 5 percent at end of 1999 to 30 percent in 2005, and almost double in brokerage, from 27 percent to 45 percent. Because these projections are based on current trends in advanced industrial countries, they do not allow for the possibility of leapfrogging.

The impact E-finance will lower the costs of providing financial services—savings that can be passed on to consumers. The lower costs for providing financial services will also allow greater access to financial services. Quantifying the full consumer gains is difficult because the gains will include not just the cost savings passed on but also better, more widely available financial services for consumers and corporations. New technology should, for example, allow credit to be extended to a wider range of consumers, including small and medium-size firms—and increasing access is an important objective in many developing countries.

The marginal costs of e-finance are much lower than those of traditional delivery channels, with each transaction costing a few cents—compared with $1 or so for transactions at bank branches and $0.50 at automated teller machines. Although there are significant upfront costs, in the medium term the online costs of delivering bank services will be much lower, at least as low as those of today's most Internet-advanced banks, such as some in Sweden.



Note: The figures show projections based on takeoff years with connectivity assumed to be in all emerging markets at the same level as the connectivity rating in today's lowest-ranked industrial country, 6 (or better if their current rating is already higher); thus the projections lead to the same minimum level of penetration in each emerging market. This is admittedly a substantial simplification, because it assumes that all emerging markets will improve their connectivity to the same degree. It also ignores the fact that several emerging markets already have higher e-finance penetration today even though their connectivity is perhaps not as high. See Annex 1 for more details.

Source: Authors' calculations.

Chapter 4:

Policy and Regulatory Issues in Electronic Payments

In most countries banks make up the core of the payments system. This dominant role developed because payment services were often linked with credit extension and the exchange of bank claims. But this is no longer the case. Many mutual funds and most brokerage houses permit individuals to automatically deposit their paychecks in cash management accounts, from which routine payments can be made automatically and irregular payments can be made by check or phone 24 hours a day. Money market accounts can be linked to a credit card that also functions as a debit card at ATMs (Allen and Santomero 1999). While payments through the account are still cleared through a bank, this is not the essential part of the transaction. Rather, it is a regulatory artifact.

Technological progress allows for the further unbundling of credit and payments services, reducing banks' importance in the provision of payment services. New non bank providers of payment services use new technologies (e-mail transfers, stored value cards, smart cards) to provide payment functions. Balances on stored value cards can typically be transferred without involving a depository institution directly (Osterberg and Thomson 1998). Thus payment services now offer a continuum of options ranging from new types of services—including barter forms (frequent flier miles, bonus points), Internet-enabled payment gateways, e-money, and stored value cards—to traditional transfers of transaction accounts held at banks.

From a regulatory point of view, these developments raise the question of which payment services should fall under regulatory oversight and what institutions should have access to the payments system. Regulatory authorities can define payment services rather broadly and extend existing regulation to all types of payment providers and their activities. Or they can define payment services narrowly as transaction and checking accounts at banks (deposit-taking institutions chartered by the regulator).

As an example, in many countries stored value or even multipurpose cards are offered by a range of providers, including transport companies. But do stored value cards issued by non financial entities constitute deposits—since the cards carry a balance—and should they be regulated and covered by deposit insurance schemes? The decision of which

alternative services to regulate will matter greatly, particularly if the form of regulation is prudential as opposed to consumer-protection related, because prudential regulation implies that the services are covered by the safety net. Since the new types of payment services cover a continuum of modalities, authorities need to evaluate carefully where to draw the line and be cognizant up front of possible shifting of the line over time due to political and other pressures. Authorities should be especially wary of extending deposit guarantees to new deposit substitutes because the moral hazard implications can be substantial.

Similarly, authorities have to decide whether to open access to the payments system to non banks and, if so, in what form. In most countries only banks have access to the payments system, and alternative providers of payment services have to clear through banks. Restricting access to the payments system to banks allows incumbent banks to preserve a core part of their franchise value.

Allowing direct entry by non banks and non financial companies (telecom and utility companies, brokers) will reduce the franchise value of banks and risk increasing overlap and blurring lines between financial and non financial companies. This could enlarge the safety net, even if by default.

Over the short term, to limit the blurring of lines, regulatory authorities could require non financial corporations to provide payment services through bank subsidiaries. More generally, authorities may want to signal clearly what type of services or institutions they will continue to regulate and supervise and require that providers offering deposit substitutes indicate to their customers that these are uninsured products and that the credit risk is not assumed by a public deposit insurance scheme. Over the long run, authorities may want to separate payment from other credit services and may want to allow freer entry in payment services.

These developments suggest that the traditional reasons why banks were considered special are no longer valid. Furthermore, these developments necessitate a review of the central bank's role in the payments system and the way it provides comfort to payments system participants.

Table 4

Public Policy Issues for the Financial Sector

	Current issues	Future issues	Transition issues
Safety net	■ Banks are considered special because they extend essential credit to firms, provide payment services, and are inherently fragile and susceptible to runs. ■ Thus governments have provided safety nets—regulation and supervision, deposit insurance, lender of last resort facilities—to minimize the adverse effects of bank failures. ■ But safety and soundness regulation and deposit insurance pose barriers to the entry of new firms and favor incumbent firms. The safety net also raises moral hazard issues.	■ Banks are no longer special because many substitutes have emerged for deposit and lending products. Thus there may be less need for a public safety net, and correspondingly less need for prudential regulation and supervision. ■ Government should increasingly allow the private sector to find mechanisms to curb excessive risk taking. ■ More efficient interbank markets reduce the need for lender of last resort facilities. ■ Moreover, banks' special role in the payments system is declining as technology allows for the unbundling of payment and credit services. Thus authorities may want to separate payment from other credit services and allow freer entry to the payments system.	■ Authorities should be wary of extending the safety net to non-deposit-taking activities and deposit substitutes. They should require financial service providers with non-deposit-taking activities to adopt a bank holding company structure or a narrow banking structure. ■ With increased competition and the decline in franchise value, decapitalized institutions will have incentives to gamble for resurrection. Thus governments need to strengthen failure resolution mechanisms and reduce extensive guarantees that often apply to all financial system liabilities.
Competition policy	■ Because banks are considered special, competition policy is subsumed under prudential policy. Competition policy aims to ensure an adequate franchise value for banks to enhance their soundness and incentives for prudent behavior. ■ Tools of competition policy include minimum capital requirements, capital adequacy, and fit and proper tests.	As the safety net is eliminated, markets for financial services can be treated like any other product from a competition policy point of view. This means that: ■ Freer trade in financial services will become even more important. ■ Scale and scope economies are unlikely to be effective barriers to entry. ■ Sunk costs, externalities, and vertical integration may be barriers to entry and could hamper competition. ■ Market and product definitions, which are critical for competition tests, will be difficult to define. ■ With globalization, competition policy will have to be coordinated worldwide.	
Consumer protection	■ Consumer protection issues relate to security risk, privacy, transparency of information, and investor protection.	■ Key public policy areas include defining consumer protection standards, defining minimum standards for self-regulating organizations, and ensuring incentives for enforcement of such standards.	■ How to modify legislation and regulations to permit proper enforcement, including minimum disclosure.

Source: World Bank Financial Sector Discussion Paper No. 4

4.1 Security risks

Internet transactions involve "open" systems; they are vulnerable to interception and fraud, including access to information by unauthorized third parties. (At the same time, electronic audit trails permit regulators to trace transactions more easily.) A (perceived)

lack of security can, in the short run, limit the use of the Internet and other electronic payments systems to small-denomination transactions, which do not warrant the costs and risks of engaging in fraud. But cryptographic techniques for ensuring transaction security are rapidly improving, and are almost fully secure for consumer transactions.

Further technological developments—better cryptographic techniques, cards with built-in chips, and other verification techniques—are expected to soon provide the security needed for large transactions, leading to complete electronic systems for consumer and B2B transactions. Nevertheless, not all operators will adopt the required technology and may need to be encouraged or required to do so by regulators as part of licensing or certification.

In some countries the laws on payment and credit transactions may not be adequate for Internet based financial and other transactions. Many countries are, however, considering legislation for the legal treatment of electronic documents, transactions, and means of authentication (BIS 1999). Some countries are introducing protocols and legal changes, including for digital signatures and certification of authenticity, to assure the authenticity of participants and legal standing (including no repudiation) of electronic transactions. This will overcome many security and other risks, stimulating e-commerce and e-finance.

4.2 Privacy

International variations on information-sharing and privacy and bank secrecy laws further complicate matters. Global standards and protocols that can be credibly enforced will become increasingly necessary, not only to assure the desired privacy, but also to allow efficient cross-border provision of financial services.

4.3 Development and enforcement of standards

Given the evolving nature of new technology, standards for e-commerce and e-finance are lagging market developments. Rapid developments make it hard to assess whether issuing standards now would help or hinder market development.

Public standards could play into the market structure in unpredictable ways. Still, there may be good reasons to establish standards at this point (aside from the general

technology standards needed for e-commerce and the Internet). A need could arise, for example, on standards for pricing structures or limits on pricing practices in (new) payment and other services. In addition, there may be a need to certify new infomediaries (indirectly) involved in financial services. There could be public goods aspects to establishing standards for Internet and e-finance transactions to remove impediments to their further growth. Private systems or standards for e-commerce and e-finance may not emerge, or there might be too much fragmentation with too many standards or too little competition if proprietary standards dominate. Governments could, after extensive consultations with the private sector, issue policy statements to help develop industry practices, thereby nurturing the market.

Development and enforcement of standards need not be the exclusive province of the government, but could also fall to SROs or SRAs. Given the international dimensions of e-finance, this will have to be a global effort, differentiated by the various types of e-finance (private retail payments, B2B transactions, and so on). These efforts will likely be complemented by private commercial agencies—rating agencies, credit bureaus, information production firms, new firms— that rate Internet firms. Still, there may be a role for governments to provide guidance through standards that must be adhered to by any SRA and, in some cases, to fill gaps left by the market. In any case, SROs and SRAs might need formal backing for their disciplinary actions.

4.4 Infrastructure Issues and the Role of Government

While a key impediment in many emerging markets is a lack of supporting infrastructure, such as telecommunications, changes now under way offer many countries an opportunity to accelerate financial sector development.

Government intervention in the financial sector has generally had poor results. Government ownership of banks retards financial sector development and increases the risk of financial crises. Efforts to reach underserved groups often fail or are captured by special interests, and can incur large fiscal costs.

E-finance reduces the need for government intervention because the private sector can

provide financial services even when a country's financial sector is weak. Market failures will be less likely because new technology will make information more easily available and, with related reforms, of higher quality. This will permit financial services to be provided more widely and make markets to trade risks and assets more complete, reducing the need for government intervention.

There will still be scope for government action beyond setting the enabling environment. As a start, government could improve the way it shares information (such as credit-related information, subject to privacy statutes). Existing infrastructure, such as post office networks, can provide access to e-finance services. In addition, government's role can change fundamentally in areas such as banking services, housing finance, insurance, non bank financial services (factoring, leasing), storage finance, trade finance, small and medium-size enterprise lending, and even micro lending.

Smart cards can deliver financial services even where financial sector infrastructure is weak. Such cards can store customer information and so extend financial services not just by banks but also by non banks. In housing, the delivery of financial services can be unbundled much more efficiently, achieving savings, lowering costs, and expanding access. In financing for small and medium-size enterprises, as the costs of delivering financial services fall, the size of profitable transactions will shrink, allowing access to financial services for more customers. Gains can be large for traditional financing such as trade finance and working capital finance.

Table 5

Internet Banking and Telecommunications Access in Various Economies

Region / Country	Percentage of banks offering online banking, 2000	Percentage of bank customers using online banking, 2000	Percentage of inhabitants with mobile phones, 1998	Computers with IP address connected to t Internet, per 10,000 people, 1998
The Americas				
Argentina	4	3	8	16
Brazil	<50	5	5	10
Mexico	<10	<1	3	9
United States	63	4	26	975
Europe				
Austria	75	4	28	163
Central Europe	35	<1	8	54
Denmark	60	5-10	36	359
Finland	85	29	57	996
Germany	60	2	17	141
Greece	40	<1	19	38
Italy	50	1	36	56
Spain	90	<2	18	62
Sweden	90	11	46	430
Switzerland	75	5	24	289
United Kingdom	50	2	25	202
Asia				
Australia	90	4	29	400
Hong Kong (China)	25	<2	47	108
India	10	<1	1	0
Indonesia	0	0	1	0
Korea, Rep. of	90	3	30	38
Malaysia	10	<1	10	18
Philippines	15	<1	2	1
Singapore	95	5	35	187
Taiwan (China)	10	0	22	48
Thailand	0	0	3	4

Source: Credit Suisse First Boston Global Bank Team 1999; World Bank 2000b.

Chapter 5:

Electronic Payment Developments & Implementation in Pakistan

Technology has come a long way in the past few decades. We see that in the late 60s and 70s, even in Pakistan, computers were introduced primarily as a means to automate the back-office functions where large processing volumes justified the cost of big mainframe and mini computers.

As the cost of technology came down in the late 70s and early 80s and with the introduction and proliferation of the personal computer, client-server technology became more of the norm. This enabled the development of front-end systems, which greatly helped organizations improve their customer services delivery.

From the mid-80s onwards, advances in telecommunications enabled the setting up of Wide Area Networks (WANs), through which organizations could transmit and gather data instantaneously from remote offices and locations. The timely receipt of information greatly enhanced management decision-making during this period.

The role of IT in a financial services organization is broadly:

1. Supporting operational efficiencies — and that simply means doing routine tasks better, faster, or cheaper. Volumes are the key here and in financial institutions, the transactions that are usually handled in the back-office operations units need to be automated from account maintenance, billing, through processing of payments, loans, trade financing, reconciliation and so on.

2. Facilitating customer services delivery — increasing customer touch points, extending the duration of service, improving service delivery, Whether by automating teller functions, providing telebanking services, installing automatic teller machines (ATMs), providing PC or internet banking. In short, making the promise to the customer — Anytime, Anywhere, Anyhow — a reality!

3. Risk management — providing the capability to manage identify, assess and control the bank's risk and exposure, whether related to operations, credit, assets, market risk and so on. Risk management also includes credit limit monitoring, dealing with interest rate and foreign exchange rate changes to manage product viability, and treasury and asset/liability management to ensure that regulatory reserve requirements are met.

4. Decision support — the availability of information and tools to determine trends, make forecasts, and plan strategically. Today the tools available for decision support are mind-boggling, and data-warehousing and data-mining provide today's management with the power to gain deep insight into customer and transaction profiles and trends, with which to make strategic decisions in implementing products and services and also to align the business with reality.

If IT does all of the above, it should enable the organization to be effective, competitive, and hopefully, profitable. In financial services, primarily because it's all about dealing with money (or money substitutes), rather than goods or services, the aspects of security, integrity and the confidence factor play a more pronounced role. Speed and timeliness are also integral to the role that IT plays in this sector.

It is an accepted fact that Pakistan is well behind some of the technology services that are available and implemented in developed financial markets some of which have been around for over two decades.

Some examples are:

- Automated payment systems like BACS, CHIPS and CHAPS, where clearing between banks is done in a totally automated form since banks submit clearing data to the clearing house in electronic form. In Pakistan we have NIFT, a facility which uses image-based technology with high-speed sorters to automate check clearing. NIFT started operating in Karachi in 1997, and has recently started operating in Lahore. There are plans to establish centres in major cities, and shorten inter-city check clearing from the present 8 to 10 days, to 3 days. One of the most promising initiatives started recently, and gaining momentum, is

one to establish a country-wide electronic clearing house. Under the auspices of the ministry of science and technology, a task force has been set up which not only has the blessings of the State Bank of Pakistan but also the commitment of many key banks. The Task Force is presently active in addressing issues of awareness, infrastructure, standards, and technology. This initiative will also provide the environment for B2B transactions, currently growing significantly in advanced countries in the e-commerce area.

- Electron Funds Transfer (EFT) which also includes the ATM, the most visible form of EFT. Others are standing instructions performed for utility bill payments and so on. Another well-known form is SWIFT, the international payment system. The important point to highlight is that funds transfer takes place electronically without any paper-based transactions involved. In Pakistan, the number of installed ATMs is still comparatively few (just 200 or so) due to high installation and operating costs, while use of SWIFT is not as prevalent as it should be, though most of the major Banks are members. Automated standing instructions, too are not common.
- EFTPoS (EFT Point of Sale) is an electronic payment method, which involves goods or services being paid for at the point of sale. The transaction may be initiated either by the EFTPoS card being swiped through a card-reading device, prior to the authorization of transaction by means of a Personal Identification Number (PIN) being inputted into a hand-held pad by the customer, or else through the card swipe being followed by the customer signing a paper voucher. It is doubtful that this will be implemented in Pakistan in the near future as it is fairly costly and technologically complex to maintain.

ATM network switches, as they are called are simply the pooling of several banks' ATMs to form a common network. The high installation and operation costs and the duplication of ATM services at many off-branch premises resulted in banks pooling their resources. By linking the respective ATM systems of these financial institutions through the switch, cardholders of member institutions of the consortium can carry out transactions at the terminal of any of the other participating financial institutions. Though a bank with a

larger number of ATMs risks losing its competitive advantage but if a bank customer was to use the ATM facilities of another bank for his transactional needs, a minimum access fee will be charged to the customer. Thus, those banks with large number of ATMs can now profitably use these machines as a source of revenue.

It is good to see a number of banks in Pakistan now forming consortia to provide these flexible services to their customers, and there is a good chance that more banks will join in.

PC or Home Banking is a service, whereby customers can use their personal computers at home, or at their office, to access their accounts for transactions, by subscribing to and dialing into the banks' own Intranet proprietary software system, by use of password. This virtually establishes a bank branch in the customer's home and offers 24 hour service seven days a week. This has not caught on in Pakistan but this is not surprising given the low number of home PCs, though a number of banks do offer these services to some of their corporate customers.

Internet banking, simply one form of PC banking, not only offers customers 24-hour access, but also the ability to bank from multiple venues, since (a) proprietary software need not reside on each machine (a browser is used), and (b) the customer accesses the bank from its website. A number of banks in Pakistan, particularly the foreign ones, are planning initiatives in this area since their parent organizations already offer these services abroad. Telebanking can be considered as a form of remote or virtual banking, which is essentially for the delivery of branch financial services via telecommunication devices where the bank customers can perform retail banking transactions by dialing a touch-tone telephone or mobile communication unit, which is connected to an automated system of the bank by utilizing Automated Voice Response (AVR) technology.

The Telebanking service provides yet another alternative to almost all of the functions available on the Automated Teller Machines except withdrawal and deposit of cash. The facilities available include checking account balance, funds transfer between current, savings and credit card accounts and bill payments. As far as the customers are concerned, it provides increased convenience, expanded access and significant time

saving. On the other hand, from the banks' perspective, the costs of delivering telephone-based services are substantially lower than those of branch-based services. Again, very few banks locally are offering these services.

E-trading (share trading on the Net) is still in its infancy. Their dealing services, like buying and selling of stocks, bonds and mutual funds via the internet are incredibly cheap in comparison with the charges of the traditional brick-and-mortar brokerages.

Corporate launches too, in the form of initial public offerings via the Net have also already taken place. Under its Capital Market Development Program, Pakistan is probably well placed to offer such services in a few years. Trading in all three stock exchanges has long been automated, having replaced the open outcry system. The Central Depository System set up in 1997 for electronic recording and transfer of securities is now well established. Further plans to introduce a rolling T+3 (trade day + 3 days) settlement in place of the weekly Wednesday settlement, and a centralized clearing and settlement system for the three stock exchanges will bring Pakistan closer to global standards for efficiency and transparency in the settlement process.

The use of technology in the insurance sector in Pakistan may be minimal and used primarily to support back-office administration functions such as policy issuance, billing and accounts receivable, claim handling, etc. The low use of technology is probably justified since the market is very small and still not sophisticated enough to warrant the use of advanced technology. It should be noted that in the West too, the insurance sector is still behind other sectors although online buying and selling, claim filing and settlement etc. are gradually being introduced.

There is no doubt that technology does not come cheaply. If one looks at the foreign financial institutions, particularly the banks, almost all use foreign application packages. These are generally integrated systems implemented over a Wide Area Network and provide online, real time connectivity of their branch network to a central system. This also provides the bank the capability to provide better customer service via inter-branch transactions, ATM service at any location, customer profiling, etc. A centralized database

provides better portfolio management, transaction reconciliation, integrity of data, management reporting and decision support.

Local financial institutions need to understand that their business goals can be achieved only with the help of IT. However, in a depressed economy, institutions must get together to share resources, networks, knowledge etc. In other countries such collaboration has resulted in automated payment systems, common ATM networks, and initiatives like Bluetooth, certification authorities, and many others. Institutions need to look outwards, rather than inwards — overcome their insecurity and gear themselves to compete on a global scale. Organizations can no longer stick their heads in the sand, ostrich-like, and pretend that the world is not shrinking and competition from other markets is not at their door. More important, many of the local organizations have to bridge the cultural gap towards the implementation of technology.

5.1 PTCL billing facility at post offices

The government intends to provide billing facility for the Pakistan Telecommunications Company (PTCL) customers at post offices across the country. The facility has been set up jointly by the Electronic Government Directorate (EGD) of the Ministry of Information Technology and the NBP. The billing project was being launched to facilitate the PTCL subscribers in areas having no banking facility.

The facility would also be used for the payment of salaries to the federal government employees as the locations were appropriately selected near government offices and residential localities with concentration of low and middle- income employees.

The government employees would be given ATM cards without any charge and called for extending the facility to other people free of charge as well.

5.2 PSO Innovations

PSO proved to be more innovative in the Oil and gas sector for developing mechanisms for payments. PSO introduced Fleet Card, a revolutionary concept in Pakistan. It is a vehicle specific card (vehicle registration number to be embossed on the card along with

the company/Fleet name) that enables you to track the purchases of each vehicle. It is for companies that want Security to control misuse and pilferage by fleet-drivers and to economize fuel expenses. The card has consolidated computerized monthly billing supported by individual vehicle billing profile and able to set limits on daily, weekly, monthly fuel consumption.

Companies which require Flexibility and convenience and consolidated computerized billing with Individual Employee spend profile can use it for reduced administrative procedures that are involved in fuel allocation and reconciliation procedures. It provides assessment of employee spend profile (amount and product wise) and it is able to give employees convenience of purchasing fuel from multiple stations. PSO corporate credit card is another initiative by the company in the electronic payment facility.

5.3 Electronic commerce banking

Although electronic payment systems for large payments have been in operation for some time, rapidly expanding volumes of foreign exchange and securities' trading are increasingly at variance with the requirements for a cost-effective and efficient electronic payment system for making low value payments. Current progress in establishing such payment systems on the internet is also under consideration in Pakistan.

The creation of an internet electronic payment system will provide opportunities for the creation of completely new sets of global and national trading relationships. The Internet offers the possibility of an 'open system's payment and settlement system which operates in parallel to the existing banking system, which is particularly suited to meet the requirements for processing of low value payments electronically. However, the institutional framework to exploit these opportunities does not yet exist. Regulatory and policy issues will need to be addressed by the government of Pakistan, in order that full advantage can be taken of the new types of commerce which could emerge in the country.

The credit and debit cards are rapidly growing in significance as the preferred method of settling small value payments associated with the purchase of specific goods and services. Separate electronic clearing and settlement systems have been established by the major credit card companies. Both MasterCard and visa have established their own networks which are used for verifying transactions world-wide. Electronic point of sale terminals permit card details to be verified in less than 15 seconds with networks linking the merchant, the credit card processor and the card issuer world-wide. For example, Visa's system, VisaNet, operates out of three super-computer centres, one in the UK at Basingstoke and two in the USA, including San Mateo in California.

Extensive communications networks link the centres and merchants using the system. These networks are growing rapidly as the trend for consumers to make payments by credit card in place of writing a cheque continues to grow.

The growth in credit card usage confirms the basic demand which exists for more efficient electronically-based payment systems. Despite these limitations, credit card companies like Visa and MasterCard are currently most active in developing secure payment systems using the Internet. Secure methods of transferring credit details and ensuring effective authorization will represent a major improvement over the off-line systems presently in use for making sales of consumer goods and services by phone or by fax. However, credit and also debit cards were designed at a time when the emphasis in the financial services industry was on transaction-based automation. Credit cards may represent too cumbersome and restrictive a system for achieving the possibilities presented by truly global low value electronic payment systems.

To date commerce on the Internet has suffered from the fact that there are no readily available means for payment. Payment to date has generally been made by credit card, but concerns about the security of e-mail have meant that this information is often sent by fax or conveyed over the telephone. Commerce-Net and others are working on secure 'web browsers.'

At present internet customers have a limited set of options for making payments. The simplest option is to provide details of a credit card number and transmit this information to the merchant vendor usually using an alternative to electronic mail, either the telephone or fax. A number of enterprises currently trading on the Internet have opted for this payment method. However, this method has a number of limitations. It requires the buyer to incur the additional expense and inconvenience of conveying credit card details and requires that the seller is accredited by a merchant acquirer/credit card processor. It is also relatively costly since credit card merchant acquirers generally charge premiums for handling telephone-based sales. A simpler method would be to provide credit card details using e-mail.

However, given the open structure of the Internet with messages routed through the network, there is a general unwillingness to make personal credit card details available in this form, since both buyer and seller are exposed to fraud.

A number of companies are developing payment systems which permit direct payments to be made anonymously. Payment takes the form of encoded messages representing the encrypted equivalent of digitized money. The aim is to be able to effect payment directly without requiring the use of intermediaries.

5.4 Initiatives by State Bank of Pakistan

Governor, State Bank of Pakistan, Ishrat Hussain, has underlined the need for making electronic banking transactions more secure and dependable. Speaking at a seminar and exhibition on "Technological innovations in the financial sector", Mr Hussain said commercial banks had been allowed encryption by the Pakistan Telecommunication Company in an attempt to make electronic banking transactions safer. He added that the electronic banking would not catch on in the country unless people put their trust in it.

He observed that the Electronic Transaction Ordinance was a step in the right direction. "The State Bank of Pakistan is also undertaking courses for its personnel, so that they could deal with financial crimes. Cyber criminals should be dealt with under a suitable law," he said.

Commending the Computer Society of Pakistan (CSP) for organizing the event in collaboration with the Pakistan Software Houses Association (PSHA) and the Sindh information technology department, he said that the SBP had chalked out a $24 million automation project. He informed the audience that sub-contracts worth $3.5 million had already been awarded to IT professionals.

He said that commercial banks had been allowed to open Internet merchant accounts. "At least 30 out of 40 commercial banks have already joined interaction switches. The SBP has acquired a swift connection for foreign financial transactions. It has also made it mandatory for other banks to do so," he said.

5.5 Developments by State Bank of Pakistan

State Bank of Pakistan (SBP), executing the largest single project of automation and the project has engaged Pakistani Companies for a number of tasks and awarded them sub-contracts worth $3.5 million so far. The project will implement a Computerized Banking Solution whereby all the branches of the State Bank will be connected via an electronic network. Data Warehousing facility and the introduction of a Real Time Gross Settlement System (RIGS) for large value and other time critical payments are expected to revolutionize the way operations in the Central Bank are performed. These projects are expected to significantly upgrade State Bank's own banking services, besides playing a pivotal role for the banking sector in general to adopt new technology based solutions.

State Bank's strategy in the initial stages of E-banking is to act as a promoter, facilitator and enabler. This is being done by creating the appropriate legal framework, development of coherent strategy with the banking sector for development of payment systems and strengthening the clearing and settlement infrastructure in the country.

According to SBP the SBP has, therefore, played a pro-active role in promoting adoption of technology based solutions in the banking sector and supporting services based on

E- Banking. E-Banking has already taken off in this country and the recent launch by Habib Bank – one of the largest banks in the country – has provided a major breakthrough. So the question is not when the facilities will be provided but how rapidly these facilities will expand.

Efforts in this direction are focused upon the following areas:

1) Creation of a robust legal infrastructure catering to the needs of E- Banking and other payments systems involving electronic settlement of funds. A key step in this direction was the promulgation of Electronic Transactions Ordinance 2002, which provides legal recognition to digital signatures and documentation reducing the risks associated with the use of electronic medium of business. State Bank is currently engaged in an exercise to further augment the legal framework for electronic settlement of transaction in the banking sector.

2) Establishing of Payment Systems Development Committee, in which commercial banks are members, to guide the development of payment systems in Pakistan.

3) Creation of a dedicated Payment Systems Department in the State Bank dealing with all issues pertaining to payment systems including E-Banking.

4) Introduction of a Real-Time Gross Settlement System (RTGS) providing an E-banking solution to banks maintaining their accounts with SBP whereby they will be able to operate these accounts from their own premises via an electronic connection with the State Bank's own servers.

Commercial banks have been allowed to open and operate Internet Merchant Accounts. Banks are being encouraged to expand the ATM network through more participation and a wider network of machines all across the country. More than two-third of the commercial banks have already joined one of the two existing SWITCHES and the interconnection between the two existing SWITCHES' which is underway will give a

further boost to the volume of transactions taking place through electronic channel. This connectivity will allow accessibility to all the ATMs installed anywhere in Pakistan.
State Bank has already acquired SWIFT connection and has also made it mandatory for Banks to acquire SWIFT connectivity for settlement of all cross border financial transactions. Expansion of automated cheque clearing services to all major cities in the country is actively being pursued. The usage of plastic money such as Credit/Debit cards is spreading quite rapidly.

Over 400 ATMs are in operation in Pakistan and the use of ATMs is rapidly increasing. Almost 1 million transactions are now taking place through ATMs every month. More and more functionalities are being provided by the banks electronically including E-Statements, funds transfers, bill payments for utilities as well as other purchases, on-line application processing, etc. By 2002, almost 40% of the bank branches have been automated and it is expected that this proportion will reach 50% by 2004. The rate of increase is phenomenal i.e. about 318%. Similarly, the number of online branches has doubled during the last two years to 570 and by 2004 this number will jump to 1356 – representing an increase of 376%. This expansion along with the growing penetration of internet will bring E-banking to more and more of their customers both in terms of numbers as well as geographical locations.

Despite the above progress, SBP believe, E-banking in Pakistan is still a relatively new phenomena and should grow much faster with further penetration of computers and internet services in the country, availability of a robust legal framework, removal of concerns about security of electronic transactions and enhanced reliability of communication lines.

Another area which will accelerate E-banking in Pakistan is Security of transactions. Until and unless consumers are satisfied that their transactions through E-banking are safe, they will not venture into this medium. Banks have been allowed encryption by Pakistan Telecommunication Authority. As mentioned earlier, appropriate legal framework, including remedial measures in the law for cyber crimes is important to

tackle issues such as cyber crime has been created but still to be tested in Courts of Law. The Electronic Transactions Ordinance 2002 covers issues such as establishment of Certification Authorities.

However, the legislation being the first step in this direction, banks are encouraged to established appropriate internal controls to prevent cyber-banking crimes and because of the availability of appropriate legal framework, cyber crimes can be suitably dealt with under the existing law. For financial crimes, various law enforcement agencies have their own specific units. Law enforcement authorities are also taking steps to strengthen their skills to suitably deal with such crimes.

Conclusion

Electronic payment developments in the world gave rise to a new field in the financial industry i.e. e- finance. The areas of security, connectivity, personalization of services and developments in the area of specific electronic currency initiatives like Beenz and Flooz dot com (Annexure 1) make the field of e- finance more risky than traditional means of finance and it is the evidence that this point of time describes the e-finance area as in its nascent stage (perhaps as discussed in the annexure Beenz and Flooz may be the new web currency in the future and it was too early to present such mechanism in front of the world of internet). Historical Evidence shows that conventional mechanisms developed in a similar way. With the passage of time the most reliable currency mechanisms for payments like currency notes and coins adopted by most of people in all over world.

On the one side e-finance through electronic payment developments offer the end users ubiquitous financial facilities that reduce time and cost with increasing customer convenience but on the other side it is prone to risks, which are its competence at the same time. That is rapid information technology developments and good information and communications technology infrastructure in the developed countries forced financial institutions and customers all over the world to enter the world of electronic finance.

Developing nations where low Internet bandwidth, week information and communications technology infrastructure and scarce awareness of the electronic facility to financial services are big question marks, future of the electronic financial industry is prone to many risks. Recent encouraging trends in the adoption of the electronic means of payment in developing countries although show a good sign but the usage of electronic payment is no more than credit and debit card transactions. This study clearly mention that online fraud is maximum happening in the financial industry despite a lot of work has been done on preventing online fraud and improving encryption technologies.

In addition to the above, it is also found that in the race of developing new information and communication technologies the financial industry regulators have ignored the regulatory framework development initiatives. During my study I found number of

electronic payment mechanisms prevailing in the world with SET and debit or credit card as most common mechanism. The study reveals that the risk associated with the electronic payment mechanism is also due to the lack of regulatory framework for electronic financial transactions and the role of respective governments of each country. It is the responsibility of Basel community of International Standards BIS and state or central banks of each country to formulate some regulatory framework in this regard, otherwise the rapid changes in the information technology will keep this field in the nascent stage for a long time. It seems that the regulators put the electronic financial industry in such a situation where it is clearly dependent on the developments in Information Technology sector. A uniform standard if not so sophisticated like Beenz and Flooz dot com initiatives but even of credit and debit card transactions can be adopted worldwide and efforts to prevent fraud in the industry will be more fruitful and focused. This can be continued until R&D efforts provide a more authenticated and user friendly mechanism.

Another important point to notice is that electronic payment mechanism initiatives have been more directed towards online shopping industry or electronic banking industry. There is a huge area of Government financial transactions available like tax and excise payments, billing, loan repayment facilities, etc, that can be offered electronically to the consumers. Efforts in the e-Government sector especially in developing countries are missing. Electronic payment initiators and researchers need to divert their focus on this area because this will provide tremendous value added facilities.

In Pakistan electronic payment mechanism developments and implementation are not more than debit and credit card transactions at the consumer end. However, recent rapid expansion of internet will develop this area soon hopefully. Despite the reasonable progress in the electronic finance industry, overall E-banking in Pakistan is still a relatively new phenomena and should grow much faster with further penetration of computers and internet services in the country, availability of a robust legal framework, removal of concerns about security of electronic transactions and enhanced reliability of communication lines.

Security in banking has always been a critical issue. Until and unless consumers are satisfied that there transactions through E-banking are safe, they will not venture into this

medium. Banks have been allowed encryption by Pakistan Telecommunication Authority. Appropriate legal framework, including remedial measures in the law for cyber crimes is important to tackle issues such as cyber crime has been created but still to be tested in Courts of Law. The Electronic Transactions Ordinance 2002 covers issues such as establishment of Certification Authorities.

However, the legislation being the first step in this direction, banks are encouraged to established appropriate internal controls to prevent cyber-banking crimes and because of the availability of appropriate legal framework, cyber crimes can be suitably dealt with under the existing law. For financial crimes, various law enforcement agencies have their own specific units. Law enforcement authorities are also taking steps to strengthen their skills to suitably deal with such crimes.

References:

Davies, Glyn. A *history of money* from ancient times to the present day, 3rd ed. Cardiff: University of Wales Press.

*e*PSO Inventory DataBase

Stijn Claessens, Thomas Glaessner, and Daniela Klingebiel Electronic Finance: Reshaping the Financial Landscape Around the World, Electronic Finance Discussion Paper No 4, World Bank Group, September2000.

Stijn Claessens, Thomas Glaessner, and Daniela Klingebiel , E-Finance in Emerging Markets: Is Leapfrogging Possible?, Electronic Finance Discussion Paper No 7, World Bank Group, June 2001.

PTCL billing facility at post offices soon
Dawn Staff Reporter, Dawn Internet Edition, 12 March 2003

Desmond Fernandes **,** *IT in financial services***,** Dawn, the Internet Edition
Syed A. Mateen , Dawn.com, 21 January 2002

Staff Reporter , Dawm.com, 27 July 2003
Haroon Sharif, Financial system and growth, 05 November 2001, www.dawn.com

http://www.google.com/search?q=cache:QQqfzND76UoJ:www.sbp.org.pk/about/speech/2003/26-jul-03.pdf+electronic+payment&hl=en&ie=UTF-8

PC Magazine. 2001. “Know Who I Am”. 16 January, www.zdnet.com/pcmag/

Prague Stock Exchange. 2001. “Trading System.” , www.pse.sz

McAndrews, James, and William Roberts. 2000. “Payment Intermediation and the Origins of Banking.” *Journal of Economic Literature Classification.*

Electronic Security: Risk Mitigation In Financial Transactions Public Policy Issues Thomas Glaessner, Tom Kellermann, Valerie McNevin*, World Bank Group, June 2002

Basel Committee on Banking Supervision. *Risk Management Principles for E-Banking*, May 2001.

Bank of International Settlements. 2001. *Electronic Finance: A New Perspective and Challenges.*BIS Papers No. 7. Basel, Switzerland:

Sholom Rosen , CREATING AN ELECTRONIC MONETARY SYSTEM, Citibank, **Prepared for the Cato Institute's 14th Annual Monetary Conference, May 23, 1996, Washington, D.C**
Catherine England, **George Mason University,** CYBERBANKING AND CURRENCY COMPETITION, **Prepared for the Cato Institute's 14th Annual Monetary Conference, May 23, 1996, Washington, D.C.**

R. Alton Gilbert**,** *Federal Reserve Bank of St. Louis* , FINANCIAL REGULATION IN THE INFORMATION AGE, Prepared for the Cato Institute's 14th Annual Monetary Conference, May 23, 1996, Washington, D.C.

Tom Kellermann ,Mobile Risk Management:E-finance in the Wireless Environment, World Bank, May 2002.

URLs visited:

http://www.businessinthailandmag.com/archive/jul00/29.html

http://www.cardtech.faulknergray.com/arch00.htm
www.sbp.org.pk

http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newsnbxen.txt&user

www.w3.org/ECommerce/roadmap

http://www.karachistocks.com/

http://www1.worldbank.org/finance/

www.pso.com.pk

www.bis.org/cgfs16.pdf

Annexure 1

Case Study

Failure of Beenz and Flooz Indicates the End of Digital Web-Currencies?

Hugo Godschalk (hgodschalk@paysys.de), PaySys Consultancy, Frankfurt, Germany

/electronic money/Internet

Saying the end of these pioneers indicates the failure of private currencies would be a rash conclusion and rather wishful thinking of players within the traditional payment industry (central banks included).

How do you recognise pioneers? They always die with an arrow in their back.

Two revolutionary online payments schemes closed their doors in August. Flooz.com terminated on August 8 without previous warning and went obviously bankrupt. Eight days later its rival beenz.com told their customers that they only had 10 days to spend their beenz money before terminating their member accounts on August 26. Most of the beenz-accepting etailers then refused to accept it because beenz.com would no longer exchange the incoming beenz against cash. Beenz was founded in March 1998, Flooz imitated the system in September 1999. A short lifecycle, typical of pioneers entering terra incognita in the endless e-world?

Most web-commentators see parallels with the end of other e-payment pioneers like Ecash and Cybercash stating that digital currencies as new payment schemes have lost the battle against traditional old economy payment schemes like credit cards. A rush job conclusion because you cannot compare digital currencies like beenz and flooz with

payment systems like Ecash (DigiCash) or Cybercash denominated in old economy currencies like DM or Dollar. A currency is not a payment system. It would be mixing up content with packaging. Therefore it makes sense to have a closer look at the revolutionary features of beenz (and flooz).

Beenz and flooz were originally conceived as account-based payment schemes for micropayments on the internet. This is a basic difference to stored value e-money-schemes like Ecash. The balances, held by online shoppers and websurfers at beenz.com, were denominated in a new private currency ("beenz"). The currency could be transferred from one member account to another, but its negotiability was restricted. A beenz unit could be bought by etailers from beenz.com for a fixed exchange rate (1 $ cent). Beenz-accepting etailers could sell the units back to beenz.com for a lower rate (between 0.5 and 1 $ cent). Etailers pumped the new currency into the virtual world as rewards to online shoppers or as gifts to websurfers. The customer could use his earned value points as money to buy goods or services at a member etailer who accepted the currency. Although other loyalty schemes in the virtual and physical world are very similar to beenz, this scheme was the first to blurr "the line between incentive points and actual currency" [Weber, see info]. Beenz´own headlines pointed out its ambitious vision: "the web´s currency", "a new kind of money", "global digital currency".

From the economic point of view an asset becomes more and more real money if the number of users and acceptors of the means of payment grows. If only one merchant accepts the asset it would be a voucher and not money. So multi-merchant acceptance of beenz supports the monetary characteristics. (It is interesting to note that from a legal point of view the multi-merchant criterion is also used in e-money regulation). So multi-merchant loyalty systems are per definition on the way from voucher to money (surrogates). It depends on your perspective if you call it a loyalty scheme or a money scheme or both, because a money scheme with limited usage is at the same time always a loyalty scheme by restricting the usage of the money to certain merchants, consumers, products or geographical areas. This restriction of private money turns the purchasing power to these pre-defined areas and could accelerate turnover (bad money drives out good money). It is not possible to achieve this with traditional state money with 100% liquidity and acceptance prescribed by law of legal tender.

Account-based private currency within closed user groups with no or limited redeemability into national currency is not all the rage. All over the world so-called barter-exchanges are operating private currency systems for B2B-,B2C- or C2C-trade (e.g. LETS Local Exchange Trading Systems). So what is really new about private currencies like beenz and flooz, linking business to consumers?

New is the way of creating money and putting it in circulation. Barter and LETS currency is usually created by the accountholder using its (interestless) overdraft facility and transferring the money to another account for payment reasons. The creation mechanism of beenz is quite different. Merchants first exchange traditional cash to private currency and then put it into circulation by transferring it to consumers as a sales related bonus or as a gift. So this privately issued multi-merchant money is – in contrast to a one-merchant voucher – usually always backed by a 100% reserve of traditional money. Based on the natural imbalance between issued and accepted value per merchant a multi-merchant system can only operate with a higher clearing and settlement scheme, rules and regulations and an exchange rate for the incoming and outgoing money.

Customers could use beenz only for spending or to transfer it to other account-holders (gift or against cash). Customers did not have the right to redeem beenz against traditional cash at the issuer beenz.com. In case of terminating the system, "the member will not be entitled to any compensation of any kind for such invalidaded beenz". Exactly that happened in August. The fiasco of beenz and flooz nurtures the strict demands of the ECB for redeemability at par value against central bank money for e-money to prevent private currencies based on e-money. Of course, from the customers point of view redeemability is a very important topic and most e-loyalty schemes do not guarantee it. But what about my hard-earned miles of Lufthansa if they go bankrupt like Swissair? And why redeemability at par value and why against central bank money? (By the way, these questions underline that this controversial article of the e-money Directive is dictated by the ECB mainly for reasons of monetary sovereignty)

To become a global player beenz.com expanded from US and UK into a dozen of countries with regional operational centres (265 employees in 15 offices world-wide). The total "money" volume issued by beenz.com could be estimated to about 1 billion beenz (redemption value approx. 5 m. US $). Also if 50% of all issued beenz were not redeemed, these figures show that the cash flow income of beenz.com could never cover its world-wide expansion or even the daily expenses. Shrinking initial capital in a market that is not growing fast enough may be one of the main reasons for its failure – as in the case of a lot of other dotcoms.

Additional to this quite normal weak point of dotcoms flooz had also to struggle with the problem of fraud. Flooz.com sold $ 300,000 of its currency to creditcard thieves acting as pseudo merchants in Russia and the Philippines who paid with stolen creditcards. So flooz.com was not a victim of fraud within their own account-based system but of traditional fraud of another payment system.

Based on available information – the reasons for the failure of both digital currency schemes seems to be quite usual and not immanent to the new product.

We see very successful multi-merchant loyalty/money-schemes in the physical world. Some of them are based on back-office accounts with a card as access instrument (e.g. Airmiles in the Netherlands or Payback in Germany). Other schemes come up with stored value chipcards with e-money denominated in private currencies. In the physical world the hype of multi-merchant schemes has already started. In the virtual world of e-commerce it is still a niche. Beenz tried to make a link to the physical world. But it was obviously already too late to change the strategy from virtual to physical. The old economy law of the necessity of making a business case shot its fatal arrows into the courageous pioneers. Maybe beenz and flooz as private digital web-currencies were ahead of their time.

Source : ePSO News letter.

Annexure2

Payment systems

ACH Datasoft allows online payment from a US bank account using the automated clearing house (ACH) bank network.

Automated Transaction Services provide real-time credit card processing and electronic checking services.

Bank Internet Payment System (BIPS) from the FSTC, is a non-proprietary protocol incorporate the SET protocols.

Beenz is an account-based Web loyalty points system, often called a Web currency.

BillPoint allows person-to-person payments from a credit card. Originally targeted at eBay customers.

Checkfree provide payment and billing solutions.

CheckSpace is a user-to-user account based scheme, linked to a US bank account, with a check-like Web interface. Targeted at small businesses, it allows e-mail payment requests/invoices.

Common Electronic Purse Specifications (CEPS)

Credit Card Network have a credit card authorization system using SSL.

CurrencyOne from ArticWeb is an SSL based credit card solution. It is used in Bank of Ireland's Clikpay credit card payment system. ArticWeb also have a voice authenticated payment system.

CyberCash offer secure credit card transactions, and electronic checks over the Internet. CyberCoin, their micropayment solution, is no longer supported. Here is the initial protocol specification for their credit card payment system. Plans were to migrate to SET for credit card payments. Also available are an abstract from a CyberCash paper presented at INET'95.

Cybergold allows you to earn, and spend, money online.

Digital Silk Road is a proposed payment system for extremely low cost activities such as delivering and routing packets.

Downtown Anywhere has a system using account numbers, and personal payment passwords.

Ecash is a fully anonymous electronic cash system, using Chaum's blind signatures. Originally from DigiCash (until Nov'98), acquired by eCash Technolgies in August 1999.

eCharge Phone allows purchases to be charged to a local telephone bill. eCharge also have an account based payment system.

eCheck Secure accepts check details over the Internet, and clears them via the ACH network.

E-coin is a token-based micropayment system, which uses a client wallet plugin. Free tokens are currently available.

eComm is an implementation of the SET protocol with extensions for the French B0' banking smart cards. There is a further extension to allow small payments, which are aggregated as a single SET transaction.

Econnect provide a card-present payment system which uses a swipe card reader, the ECashPad, to read (debit/credit/smart) card details which are sent only to the bank. More research can be found here.

E-gold allows payments in gold (silver, platinum, or palladium) to be made from customer to customer using an account-based system.

eMoneyMail , from Bank One, allows person to person payments, using a credit card or checking account.

ExchangePath is an account based payment scheme, funded with a credit/debit card, and with group billing capabilities.

First Virtual Internet Payment System. (now defunct)

Flexible Internet Secure Transactions Based on Collaborative Domains. Appeared at the Security Protocol Workshop'97.

Flooz is a central account based payment system allowing user-to-user payments.

Fundamo is an account based mobile commerce architecture which allows mobile users to make and receive payments, initially over GSM.

GlobalCollect, a payment provider based in the Netherlands, provide cross border collection of consumer payments made using local payment cards, bank transfers and check payment options.

HashCash is a token based postage scheme using partial hash collisions.

iBill provides credit card and check processing.

iCanBuy allows parental control of online spending. Parents fund a child's online account using a credit card and can specify where and how the funds may be spent.

i-Escrow is a third party which holds a buyers money in trust, until a vendor delivers purchased goods.

InternetCash is a prepaid card that is purchased from a real-world store and spent on-line. A temporary anonymous account is setup from the unique card ID (which looks something like: 3842 F932 J283 7832 PRXZ), and its value is decremented as purchases (as small as 50 cents) are made on-line.

Internet Secure ATM Payments (ISAP) is a NACHA Internet Council project, which allows ATM/debit card purchases to be authenticated with a user digital signature.

IPAY draft from the IETF Payment Working Group. (now defunct)

iPIN is an account based system, that aggregates purchases and charges them monthly to your ISP bill.

iWinpak is a PGP credit card application for Windows.

The Java Electronic Commerce Framework (JECF) is not an actual payment protocol, but will provide a framework for other payment protocols including SET, smart cards, micro-transactions, electronic checks and other tokens-based schemes.

LETSystems (Local Exchange Trading System) and community currencies.

Magex, backed by NatWest Bank, is an account based payment system for encrypted content.

MagnaCash is an online account management and money transfer system, a former division of Cybergold.

MBroker, from MoreMagic, provides user billing/payment transaction management for chargable network services.

Micro Payment Transfer Protocol (MPTP) from the W3C Electronic Payments group. The W3C continue their work on micropayments by producing a micropayments markup and micropayments API.

Mondex smart card based payment scheme.

Mon-e is an account based system which is funded using a real-world prepaid card.

NACHA , have a number of Internet electronic payment initiatives including Internet Secure ATM Payments (ISAP) , where a user digital signature authenticates debit card holders, and DirectPay , which allows Internet initiated ACH credits.

NetBill Electronic Commerce Project, and related publications including a good introduction to NetBill.

NetCard is a hash-chain based micropayment scheme, as part of the NetCard Project at Cambridge University.

NetCash ,an introductory article and the NetCash Home Page.

NetChex , a debit card based scheme.

NetFare is a pre-paid information access card for making small, aggregated, incremental payments over the Internet for purchases of electronic delivery of information.

NetPay is a micropayment system based on PayWord, which allows partially unspent chains to be transferred between vendors.

O-Card , from Orbiscom, uses a one-time credit card number, which is linked to an original credit card, per transaction. The merchant clears the number through the credit card network in the usual manner.

PayByCheck.com processes U.S. checks online, depositing funds into a merchant's account.

PayMe , as presented at the 4th WWW Conference , Boston, Dec.95 by me!

Payme.com is a user to user central account based system.

PayMyBills.com is an account based bill payment service.

PayPal allows user to user payments, where the payer uses a credit card to pay money into another user's account.

PC Pay is a smart card based system for Internet payments and banking.

Pocket Pass is a prepaid account, usable for online payments, user-to-user payments, and as a US phone card.

PrivateBuy.com provides an anonymous debit account, which can be used online wherever a credit card is accepted.

QPass aggregates small purchases at multiple merchants and charges against a credit card periodically. Reminds me of the First Virtual model, but with a nice Web interface.

QuickCommerce is a credit card and ACH check clearing system.

RocketCash is an account based system, allowing parental control of spending. The RocketCash account can be funded using a check, money order, or credit card.

SafeDebit is a debit card, encoded on a regular CD, for use in the a PC CD-ROM drive for purchases from participating merchant Web sites.

Secure-Bank.Com provides online transaction processing solutions for credit cards and check drafts, based on SSL.

SecureClick , from Cyota, uses a one-time transaction number which is linked to a credit card account, and is cleared through the credit card network as normal by a merchant.

Secure Electronic Transaction (SET) from Visa/Mastercard. SETCo oversees issues relating to the global deployment of SET. FreeSET is a free Java implementation of a SET user wallet, with a JavaCard component.

SecureTrans is a real-time credit card processing system and electronic checking service, using SSL.

Secure Transactions Technology (STT) from Visa and Microsoft. Old press release. Superseded by SET.

SmartAxis allows stored value held on smart cards to be used over the Internet. Currently Proton and Mondex cards are supported.

SureFire Commerce provide credit card transaction processing services as part of their e-commerce solutions.

SVP : A Flexible Micropayment Scheme. Appeared in the proceedings of the Financial Cryptography '97 Conference.

TeleCheck, is a large processor of online check payments, and provides a number of products for accepting checks over the Internet.

TeleVend allows payments for physical goods from a mobile phone, charging the amount to a phone bill or bank account.

TipJar Internet Treasury allows value to be transferred between TipJar accounts using the Web.

VirtualPay is an on-line bill payment system

WebCharge, from Anacom, offers real-time credit card processing services based on SSL.

WebFunds, a Java application that acts as a host and platform for payment systems such as SOX, and user features such as email payments.

WebMoney transfer system, is an account based system with some anonymity, allowing transfer between temporary accounts using wallet software.

WiSP, from Trivnet, is a payment system which uses the existing relationship with an ISP, to allow third-party purchases to be billed by that ISP.

WorldPay provide multi-currency credit/debit card and account based micropayment solutions.

Yahoo! PayDirect will allow user-to-user payments, provided by DotBank.com.

Ziplock is a credit card payment system where customers receive a key code to unlock the product only after it has been downloaded and their credit card authorized.

Listing of online banks worldwide. Security First Network Bank is an Internet Savings Bank.

Source: Network Payments Menu

Annexure 3

Selected Smart Card projects in Emerging Markets

Africa	Card	Institutions	Project Description
Common Market for Eastern and Southern Africa[6]	**Mondex e-cash**: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the internet.	Eastern and Southern African Trade and Development Bank ("PTA Bank")	The Eastern and Southern African Trade and Development Bank ("PTA Bank"), purchased the franchise rights for Mondex, The deal, which is on behalf of the Committee of COMESA Central Bank Governors, may be the largest governmental endorsement of smart card technology and follows the five existing Mondex franchises in Africa (South Africa, Lesotho, Namibia, Swaziland, and Ghana). The Mondex electronic cash application allows for off-line transactions and has both multi-currency and cross-border capability. Because it allows for the transfer of value between cards, without the need to centrally record every transaction, the Mondex e-cash application can function without developing a costly and comprehensive traditional infrastructure to support it. Mondex also offers the ability to download value directly from chip to chip using a phone, therefore bringing flexibility to both retailers and consumers at a relatively low cost. Mondex's unique security architecture allows for person-to person transfer of electronic cash, also enables a cardholder to carry up to five different currencies at once. This interoperability means that Mondex's technology is flexible enough to be used as an alternative to cash across a number of the COMESA territories.
http://194.112.42.16/mondex/cgi-bin/printpage.pl?style=noframescash&&path=../documents/newsfweyk.txt			
Ghana	**Visa Horizon**: chip-based, pre-authorized, offline payment card	Visa International, Standard Chartered Bank Ghana	Visa International and Standard Chartered Bank Ghana launched the first domestic Visa card program in the West African country and the first public use of Visa Horizon, a chip-based, pre-authorized, offline payment card. The program marks the first large scale roll out of Visa Horizon with up to 100,000 offline domestic debit cards being issued and over 300 merchant sign-ups over the next five years. It is also the largest planned implementation of chip payment technology in West Africa and an example of how chip cards can be used to overcome traditional telecommunication weaknesses in new growth markets.
http://www.visa.com/av/news/press_release.ghtml?pr_form_edit=330&edit_file=			
Ghana	**Mondex e-Cash**: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the internet.	Mondex Ghana LTD	Hitachi Europe Ltd. won a contract to supply a smart card based, electronic banking solution to Mondex Ghana Ltd., Mondex Ghana Ltd. (MXG), is a joint venture company established by the two leading Financial Institutions in Ghana, namely Ghana Commercial Bank Limited (GCB) and Agricultural Development Bank (ADB) to exploit the Mondex electronic cash franchise. Mondex Ghana Ltd. intends to deploy the unique and innovative Mondex electronic cash system in phases to bring modern banking to the door steps of over 18 million Ghanaians (90% of who are currently un-banked). The project, worth in excess of $2 million, shall be the first example of an e-cash banking project in West Africa.
http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newsuyn07.txt&user=			

6 Angola , Burundi, Comoros, Djibouti , DR Congo, Ethiopia, Eritrea, Kenya, Malawi, Madagascar, Rwanda, Seychelles, Sudan, Tanzania, Uganda , Zambia, Zimbabwe

Asia	Card	Institutions	Project Description
Indonesia	**Paspor BCA/Maestro/ Cirrus card:** PIN-based, on-line, real-time debit program	MasterCard, BCA	MasterCard International and BCA—the biggest private bank with 800 online branches and approximately eight million customers in Indonesia—introduced the Paspor BCA/Maestro/ Cirrus card, allowing millions of PASPOR BCA cardholders to have access to Maestro and Cirrus facilities. Maestro, MasterCard's global debit brand, is the only Personal Identification Number or PIN-based, on-line, real-time debit program in the region. The MasterCard Cirrus/Maestro Network allows cardholders to withdraw local currency from their accounts at over 560,000 Cirrus ATMs in 102 countries across the globe.
http://www.mastercard.com/about/press/pressreleases.cgi?id=344			
Korea	**Mondex e-Cash and MasterCard M/Chip™:** multi-functional-credit, debit and other	MasterCard Korea Kookmin Card	One of Korea's largest credit card companies, Kookmin Credit Card, and MasterCard Korea, are to jointly introduce one of the first multifunctional smart cards, with both chip and eCash functionality. The card, called the Kookmin Trade Pass Card, will integrate multiple applications such as credit card, debits, electronic wallet, ID card and automated passenger clearance. Operating on the Multos smart card platform, the cards will have credit and debit functionality through MasterCard's credit/debit application for chip, M/Chip. Cash purchases will be enabled by Mondex's Electronic Cash application. Card holders will be able to choose from either program for specific financial transactions.
http://www.epaynews.com/archives/index.cgi?ref=browse&f=view&id=982251131212120150 50			
Philippines	**Visa Cash:** card loaded or with predefined value designed for payments over the internet, mobile phones and for low-value purchases	Visa International, major banks in the Philippines	Visa International announced that several banks in the Philippines intend to roll out 10 million Visa Cash electronic purse cards over the next five years. The banks, among them Equitable Bank, Metro Bank, Union Bank, Banco De Oro and First E-Bank, signed a memo of understanding with several other partners, including the Philippines Long Distance Telephone Co., the country's largest telecommunications company; 7-Eleven stores and other retailers; and two major theme parks. The partners would accept the reloadable cards, which could also be used on the Internet. The teleo now issues more than 14 million of its own chip-based prepaid phone cards each year.
http://www.cardtech.faulknergray.com/arch00.htm			
Philippines	**Mondex e-Cash:** multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the internet.	Mondex Philippine, Inc.	In October 2000, Mondex Philippines projected a cardholder base of at least 800,000, with 500 Mondex loading stations and at least 15,000 commercial establishments in different industries. Mondex electronic cash on the high security MULTOS smart card platform gives issuers greater flexibility and control over the range of services they can provide. Mondex electronic can be used across open networks such as telephony or the Internet. It is ideal for high volume, low-value payments. MULTOS can hold a number of applications (e.g. e-cash, credit and ticketing) and run them securely and independently on a single smart card. Under the terms of an agreement with MasterCard International and Mondex Asia, Mondex Philippines has the license to operate the Mondex technology for the local market. The company also has the right to promote and sub-license the technology to financial institutions, merchant establishments and other service providers in its nationwide deployment of the Mondex chip-based cards.
http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newscebas.txt			