Management Dynamics

Volume 3 | Number 1 Article 1

March 2002

Electronic Payments Services in India:A study

M. P. Gupta
Assistant Professor,Department of Management Studies, IIT, Delhi

This is an attempt to review some of the electronic payment models, identify cost factors affecting electronic payment and carry out case studies of payment gateways in India. It does not address Payments such as ATM, Credit Cards as being used offline (other than Computer Networks). Three models of e-Payments are discussed. The requirement is to evaluate some of the options available for e-Payments and address some key specific concerns of the users as this form of payments is yet in nascent stages and would be one the most dominant and widely used applications in the future. Electronic money systems are still in the relatively early stages of development, and the timing of many future developments is likely to be slower than some people expect, for there are many obstacles to growth. These include issues relating to interoperability, security and privacy, and transaction verification and authentication. Though India has cleared the IT Bill during the budget session 2000, its enforcement will make it more viable for the customers to consider making payments over Internet and subsequently ensure the gradual appreciation of e-Payments system.

Electronic Payments Services in India : A Study

M.P. GUPTA*

INTRODUCTION

Implementation of electronic payment systems is in its infancy and still evolving. The technical, economic, cultural and legal components of electronic payment systems are not fully understood. As a result, there are a number of competing proposals and implementations of electronic payment systems. Technological breakthroughs promise consumers and retail businesses a wide range of financial services and products in an electronic or digital format. The decline in cost and increase in capacity of computers, as well as advances in communications technology, have altered not only the way information is communicated but also the cost of processing and storing information. These changes, in turn, have led to the emergence of two new forms of retail payment systems: electronic cash and banking from home by personal computer. Among the many challenges these emerging developments create, is determining the appropriate role for government in the new digital world of financial services. Many argue that the private sector should resolve most policy issues and that government should

* *Assistant Professor, Dept. of Management Studies, Indian Institute of Technology, Delhi*

only act when there is clear evidence of market failure. There are others who want the government to play an active role, going so far as being the exclusive issuer of electronic cash. Still others recommend some intermediate approach.

A review of the role of government in the traditional world of money and finance could be helpful in understanding the competing interests in this debate. In the traditional world of finance, industry has been the source of product innovation and solved many problems on its own. The public has looked to government to set and enforce basic rules that provide a foundation for, among other things, consumer rights and responsibilities (in such areas as protections against loss and invasions of privacy); law enforcement tools and techniques to combat financial crimes; the issuance of legal tender; and the management of the money supply and the payments system. With respect to electronic cash and banking, the need for and application of many of those laws is less clear, and the resulting ambiguity creates issues for the private and public sectors. Determining where to begin and what classifications to make is a complex undertaking. Understanding the pace of change may help put this issue into perspective. If it takes time before consumers make widespread use of these products, there will be a lot of room for markets to engage in experimentation and for providers to solve consumer and governmental concerns.

The term "e-money" encompasses a wide variety of existing and planned products designed to provide an alternative to traditional means of payment. This diversity of potential and existing e-money products makes it difficult to render a single description that encompasses all electronic money systems in terms of technological, market, or legal distinctions. For purposes of this study, however, an "e-money" or "electronic stored-value" product is a prepaid balance of funds, or "value," recorded on a device controlled by the consumer, generally either a card or the consumer's personal computer. E-money can be used for point of sale or for Internet-based purchases. The balance on the device is decreased, or debited, when the device is used for payment. A wide variety of card-based systems are possible, differing according to the technology used, whether the system is "open" or "closed," whether transactions occur on-line to a central system or off-line, and whether the cards are disposable or reloadable.

Card-based stored value has been in existence for many years. Early generations of card-based stored value, often known as pre-paid cards, involve recording a balance of funds on a magnetic stripe that is debited by the terminal after each use. Although magnetic stripe technology provides a low-cost means to distribute stored value, it does not provide sufficient safety from tampering or counterfeiting to be applied to off-line systems in which relatively large amounts of value will be placed on the cards. In addition, options for reloading of magnetic cards are limited as is the ability to store transaction information. Smart cards, i.e., cards with an embedded microprocessor chip, provide features superior to those of magnetic stripe cards. The microprocessor chip can store and manipulate data according to pre-programmed functions on the chip and external instructions from a card-reading unit. Smart cards promise additional security by permitting sophisticated encryption technology to protect the value on the card from counterfeiting. In addition, smart cards may bundle various products on a single card, that could function as a credit card, a debit card, a stored value card, and a repository of personal information (such as a driver's license, medical information, etc.).

Many card-based systems presently in use are "closed" systems — systems where the value is only redeemable in exchange for the issuer's goods or services. Most of these systems use magnetic stripe technology. Common examples of closed systems include transportation systems in major metropolitan areas, photocopiers in public libraries, and long distance telephone cards. Utilities, laundry and parking facilities are also increasingly incorporating stored value systems. Other closed systems are multi- functional, and usually involve smart card technology. These systems generally involve a narrowly defined group of consumers (for example, college students), a small group of merchants, and a relatively small geographic area over which to install the necessary infrastructure. Such systems are also gaining in popularity. These semi-closed systems are most often seen on university and corporate campuses and surrounding environs, and on military installations.

In truly open systems, on the other hand, e-money could be used with many merchants over an extended geographic area and functions as a general medium of exchange. Such systems only exist in limited pilots such as the Mondex pilot in Guelph, Canada. In 1998 Mondex stated that 560 merchants representing over 90 percent of all merchants in Guelph accept Mondex as a payment option. Some stored-value card systems, such as pre-paid phone cards in the United States, interact with a central database system that maintains the records of funds associated with each card and requires verification of every transaction on-line with the central system. However, most of the e-money systems envision that transactions will typically be off-line except for purposes of purchasing, reloading or redeeming the stored-value. Many of the current stored-value systems are reloadable, permitting consumers to add to the value on the cards through machines that accept currency or credit cards. Where cards are linked to the consumer's depository institution account, they can be reloaded through ATMs and in some cases through personal computers equipped with remote computer banking software and a few e-money systems are designed primarily for Internet transactions, permitting consumers to use personal computers to make payments to other parties via Internet e-mail or other computer-to- computer communication methods. Consumers wishing to utilize these Internet systems must first install specialized software on their computers. In these systems, the device that stores the value is generally the consumer's personal computer rather than a card. The distinction between smart card and Internet based e-money systems appears to be diminishing as some providers of stored value cards are testing their systems internationally for Internet payments. Future systems may integrate these and other payment methods, possibly through the use of a smart card reader attached to the consumer's personal computer.

EXAMPLES OF ELECTRONIC PAYMENT

Electronic Cheques

Traditionally, cheques play an important role in the financial world both in terms of number of transactions and in value of transactions. As the marketplace changes and electronic commerce becomes more prevalent, a need arises to transform the traditional paper cheque for the online market while maintaining its attributes as a form of payment. That is to develop and deliver "electronic cheques" (e-cheques). A number of initiatives to support the e-cheque are in development, one of the most well-known is the Financial Services Technology

Consortium (FSTC), which is a non-profit organization in US backed by an array of the large banks and financial service providers.The newly developed FSTC Electronic Cheque is a secure, all-electronic payment facility modelled on the traditional paper cheque. Consumers and businesses will use the FSTC Electronic Cheque as they use paper cheques and the existing framework of inter-bank clearing systems will be maintained. Electronic Cheques will provide rapid and secure settlement of financial accounts between trading partners over open public or proprietary networks, without requiring pre-arrangement. The Electronic Cheque is initiated electronically from a variety of devices, such as a personal computer, screen phone, ATM or accounting system. It uses digital signatures for signing and endorsing, and digital certificates to authenticate the payer, the payer's bank and bank account. In India, CMC has developed a prototype for issuing e-cheque.

One possible scenario of an Electronic Cheque payment system and the steps of an e-cheque payment are :

Pay : The payer receives a bill/invoice from the payee, issues an Electronic Cheque in a secure envelope, and sends it to the payee. The secure envelope contains the original bill/ invoice and the payment instruction which is digitally signed by the payer using private key cryptography.

Deposit : The payee receives and decrypts the envelope, validates the signature of the payer, and makes sure the invoice matches the original invoice. When all the validation is complete, the payee endorses the cheque by using digital signature and deposits the cheque to the bank.

Clear : The payee's bank, in turn, validates the payee's signature and settles it with the payer's bank through existing channel.

Pay : The Pay operation in Electronic Cheque is mapped to the Pay Request in the Payment Model. The Pay request carries the invoice, authentication and payment instruction.

Deposit Payment Issuance : The Deposit operation in the Electronic Cheque is mapped to the Payment Issuance Request in the Payment Model. The payee first authenticates the payer, and makes sure the invoice is correct. The payee then issues the Payment Issuance Request to the payee's bank. It should be noted that the authorization and money transfer is combined in this case. When the bank receives the Payment Issuance Request, it first ensures the account has enough funds and then transfers the funds to the payer's bank.

Electronic Cash

Cash is different from credit/debit as it usually involves the immediate transfer of value with no intermediate third party involved at the time of the sale. Some E-Cash systems also provide so-called anonymity to protect the buyer's identity as well as other desired properties such as transferability and divisibility, however, at additional cost. Electronic Cash or e-cash has the same basic properties except that value is transferred electronically. Because of the low-overhead, some E-Cash provides a way for consumers and businesses to handle micro-payment profitably on the Internet. Off-line operations also provide high scalability. E-Cash is ideal for transactions which are below Rs100. Typical purchase includes newspaper

or research articles, pay-to-view or pay-to-play online gaming, software distribution, etc. The flow of the E-Cash's pioneer system - Digi Cash, which is still followed by most of E-Cash protocols except perhaps the elimination of on-line verification.

In DigiCash, money is denoted as a coin token which is a sequence of digital bits. A customer gets digital coins by withdrawing from a bank, then he could spend those coins buying goods from a merchant. During each purchase, digital coins are transferred from the consumer to the merchant. When the merchant receives the digital coins, it automatically sends them on to the bank and waits for acceptance before sending the goods to the consumer. To ensure that each coin is used only once, the bank records the serial number of each coin in its spent coin database. If the coin serial number is already recorded, the bank has detected someone trying to spend the coin more than once and informs merchant that it is a worthless copy. If, as will be the usual case, no such serial number has been recorded, the bank stores it at that position and informs merchant that the coin is valid and the deposit is accepted.

Lately, E-Cash is combined with the smart card technology (by Mondex) and provides an easy way for the customers to carry E-Cash in his pocket. E-Cash can be used not only on the Internet but also paying toll, parking meter, newspaper, etc. In the Mondex system, digital coins are not required to be transferred to the bank for validating at each purchase. Validating is done by the microchip in the smart card. This allows even more efficient and cost-effective transactions.

To apply the Payment Model to E-Cash, following options are available :

Automatic Clearing House (ACH)

The ACH Network is used to make consumer and corporate payments. Currently an estimated 90 percent of all ACH transactions are consumer transactions. Some ACH applications include annuity payments, ATM settlement payroll, point-of-sale catalog, savings transfers, cheque disbursement, subscription, commercial paper redemption, utility payments.

Electronic Funds Transfer (EFT)

Electronic Funds Transfer (EFT) is the electronic exchange of credit and debit transactions in standard formats between an originator and a receiving individual, corporation or other entity allowing funds to be transferred to and from banking accounts using ISO 8583 and EDI standard protocols. Generally, Electronic funds transfer means any transfer of funds, other than a transaction originated by cheque, drafts, or similar paper instrument, which is initiated through an electronic terminal, telephonic instrument, or computer or magnetic tape so as to order, instruct, or authorize a financial institution to debit or credit an account via Fedwire, Bankwire, automated clearinghouses (ACHs), and other automated systems.

Financial EDI

Electronic Data Interchange (EDI) is the exchange of documents in standardized electronic form, between organizations, in an automated manner, directly from a computer application in one organization to an application in another. EDI's direct impact is to reduce the amount

of data capture and transcription. This generally results in a decreased incidence of errors, less time spent on exception handling, and fewer data- caused delays in the business process. Benefits can be attained in such areas as inventory management, transport and distribution, administration and cash management. The standardization of documents was a necessary concomitant to that change. In 1968 the United States Transportation Data Coordinating Committee (TDCC) was formed, to coordinate the development of translation rules among four existing sets of industry- specific standards. A further significant move towards standardization came with the X12 standards of the American National Standards Institute (ANSI), which gradually extended and replaced those created by the TDCC. The official mission of the X12 Finance Subcommittee is: "Define, develop and support new transaction sets and review proposed changes to existing transaction sets that relate to the request, initiation, processing, control, reporting and security of financial transactions.

The standard set include:

- X12-820 Payment Order/Remittance Advice
- X12-821 Financial Information Reporting
- X12-824 Application Advice
- X12-827 Financial Return Notice

An example of EDI is the X12.820 transaction for payment authorizations to banks or credit unions. X12.820 is used to convert or translate customer financial payment data to the standard format. The X 12.820 message is then sent to the business banking partner to authorize remittance or other payment via the use of ACH (Automated Clearing House) Electronic Funds Transfers (EFT) or the use of the Federal Reserve Banks Wire Network (FEDWIRE).

At about the same time, the U.K. Department of Customs and Excise, with the assistance of SITPRO (the British Simplification of Trade Procedures Board), was developing its own standards for documents used in international trade, called Tradacoms. These were later extended by the United Nations Economic Commission for Europe (UNECE) into what became known as the GTDI (General-purpose Trade Data Interchange standards), and were gradually accepted by some 2,000 British exporting organizations. Problems created by the trans-Atlantic use of two different (and largely incompatible) sets of standardized documents have been addressed by the formation of a United Nations Joint European and North American working party (UN-JEDI), which began the development of the Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT) document translation standards. A full range of business documents is in the process of being developed.

Bill Payment : *Consumer Payment Process*

This process represents the payment of an invoice/statement and delivery of related remittance information. The Consumer payment process has several variations and involves a payment system. The credit and debit are two payment process variations based on which party creates the payment transaction.

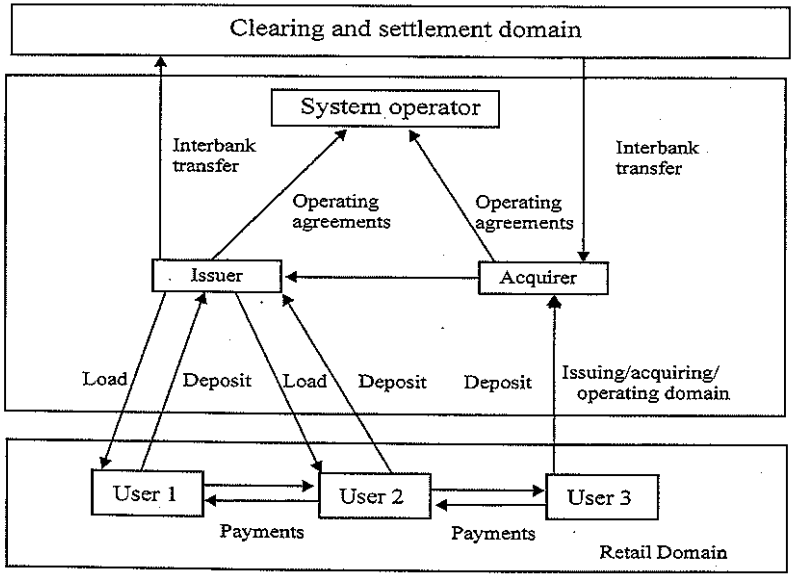
The Consumer Payment - Credit process is initiated by the Consumer. It represents the Consumers intermediary (Consumer Service Provider) creating a credit transaction to the receiving Biller's bank account and creating a debit transaction to the Consumer's bank account. Even though this transaction creates both a credit and a debit transaction, it will be referred to as the Credit Process (from the Biller's point of view).

The Consumer Payment - Debit process is initiated by the Consumer. It represents the Consumers intermediary (Consumer Service Provider) passing information to the biller which allows the Biller to create a debit transaction to the Consumer's bank account. Some Billers have already created automated debit processes which require a one time up front authorization from the Consumer instead of an authorization for each payment.

MODELS OF ELECTRONIC MONEY SYSTEMS

We can identify a general model and two specific models based on single and multiple issuer system. In the general model, three separate domains are defined (Figure 1). The clearing and settlement domain, in which financial institutions, clearing houses and the central bank fulfil the interbank financial obligations resulting from electronic value transactions; the issuing/acquiring/operating domain, in which a structure is set up for issuing and acquiring electronic value as well as for interacting with the clearing and

Figure -1 :
General model



settlement domain; and the retail domain, in which the actual value transfers between users take place:

- loads: transfers of value from the issuer to users;
- payments: transfers of value between users;
- deposits: transfers of value from users to an issuer or an acquirer.

Here we focus on the last two domains. For reasons of simplification, some flows such as the financial transfers between the various participants in the issuing/acquiring/operating domain resulting from the issuing and acquiring of electronic value are not represented here.

Given that the arrangements in the issuing/acquiring/operating and retail domains can vary considerably, it is not possible to give an exhaustive overview of all possible models. However, two simplified models of electronic money systems are presented here to illustrate the arrangements that take place among the entities in the issuing/acquiring/operating domain as well as the degree of transferability of value in the retail domain. In the case of a single-issuer system (see Figure 2), the flows of value are similar to those that take place in cash payment systems involving an issuing institution (central bank), the banking system and the retail system.

Figure -2 :
Single issuer system with free transferability between consumers

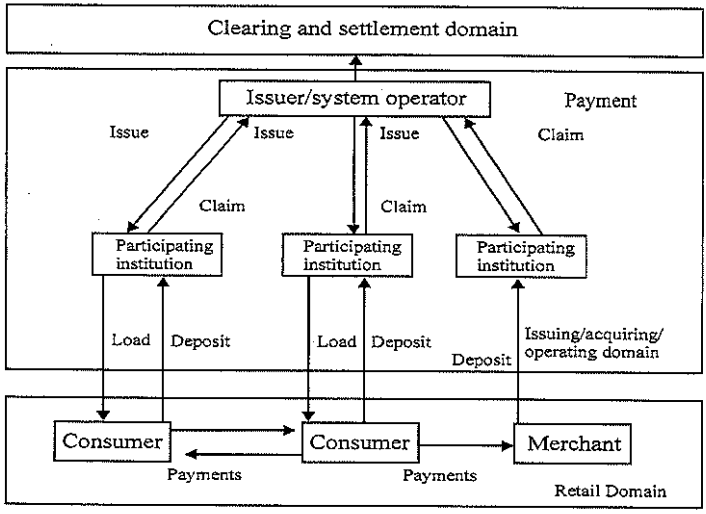
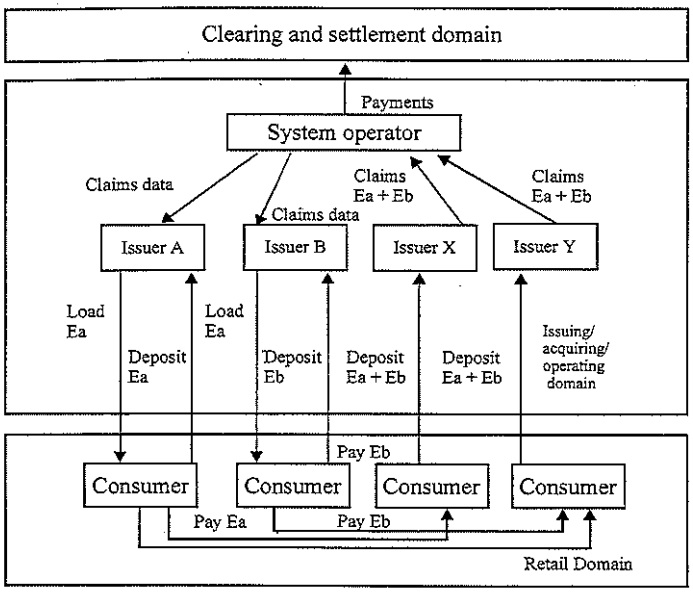


Figure-3
Multiple-issuer system with transferability limited to one payment transaction



Ea : electronic money issued by A
Eb : electronic money issued by B

A single issuer creates electronic value and issues it to participating institutions, typically banks. These institutions load electronic value onto their clients' (consumers') devices; this electronic value is used by consumers for payments; merchants and consumers deposit these funds with their banks (participating institutions); the value is claimed from the issuer. The interbank payments resulting from transfers of electronic value (issuing and redeeming) are processed and effected in the clearing and settlement domain. In such a model, the issuer will also typically be the system operator and the participating institutions will also play the role of acquiring institutions. In the retail domain, consumers are allowed to transfer value freely between themselves (purse-to-purse transactions) and to merchants, but merchants are obliged to deposit the electronic value received as payments.

In a multiple-issuer system (see Figure 3), the main entities in the issuing/acquiring/ operating domain are the issuers, acquirers and system operator. Although in this model issuers and acquirers are distinct for reasons of clarity, it will often be the case that institutions are both issuer and acquirer. Each issuer creates and issues electronic money to its clients (consumers); merchants receive payments from consumers; merchants deposit these funds with their acquirer; the system operator collects from the acquirers the claims on the issuers,

consolidates those claims by issuer and transmits the relevant information to them; the interbank payments resulting from these claims are processed and effected in the clearing and settlement domain. In the retail domain, electronic value held by consumers can only be used for payment in transactions with a merchant; electronic value collected by merchants can only be deposited with acquirers. Consumers can deposit electronic value with their issuer. Figure 3 provides an illustration of the possible functions carried out by a single system operator. However, system operators' responsibilities vary considerably and electronic money systems might have several system operators.

POTENTIAL COSTS OF E-PAYMENT FOR CORPORATES

E-Payment Requirement gives rise to different types of costs. Many of these costs are generic to any E-Payment Requirement; others occur because of specific E-Payment Requirements. The cost of E-Payment Requirement consists of *opportunity and operating costs* that arise from activities or changes in activities that are required by payment mechanisms. Opportunity costs occur when a E-Payment Requirement causes the producer to forgo profitable activities. They generally result from prohibitions of certain activities. Opportunity costs also arise when E-Payment Requirement increases costs to such an extent that they discourage the introduction of a new product. Operating costs arise from E-Payment Requirements that corporates perform certain tasks.

There are two types of operating costs—start-up and ongoing.

Start-up costs are the one-time costs of changing activities to conform to the E-Payment Requirements. They include set up costs , legal expenses for interpreting the E-Payment Requirement, advising managers, and reviewing procedures and forms; managerial expenses for reviewing and revising procedures and forms, coordinating compliance activities, and designing internal audit programs; training expenses; costs for information systems and storage of records; expenses for programming and testing of software; and costs of designing new forms and destroying obsolete forms.

Ongoing costs are the recurring costs of performing the activities required by a E- Payment Requirement. Ongoing costs include costs such as managerial expenses for monitoring the performance of E-payment mechanisms, employees' compliance and for coordinating compliance examinations with regulatory agencies'; labor expenses for preparing reports and disclosure statements; expenses for resolving errors; and printing and postage for disclosures. Managers' time and the possible delay in introducing innovations may be considered an ongoing cost in a dynamic market. Some E-Payment Requirements require institutions to perform activities that they would not do in the absence of E-Payment Requirement. The total cost of E-Payment Requirement is the cost of performing all of the activities that it requires. In some cases, total cost and incremental cost may be the same, but in other cases they may differ.

The other cost is the existence of *economies of scale costs* which might discourage new products because high per-unit costs occur when output is still relatively low. Costs for E-Payment Requirement may exhibit economies of scale because of indivisibilities in regulatory

compliance. For example, the software required to generate required disclosures generally cannot be divided. The merchant buys the entire package, which it can then use to produce any number of disclosures. If the cost of the software is fixed, the average cost of disclosures will decrease as the number of disclosures increases. Another example of indivisibility is the time needed to learn the E-Payment Requirements. Managers cannot afford to learn only part of the E-Payment Requirements, nor can employees be partly trained. Thus, a finding of economies of scale for E-Payment Requirement seems entirely reasonable. Electronic stored-value transactions are often substitutes for cash transactions, which provide little, if any, documentation or records and no protection against the loss of the instrument.

E-Payment Requirements

If, as seems unlikely, E-Payment Requirement were to apply to all stored-value transactions, receipt printers would need to be installed in vending machines, parking meters, and other small-value, self-service machines. If installation of such printers was not technically or economically feasible, the E-Payment Requirement would preclude the use of stored-value products in such places. A receipt E-Payment Requirement would make it necessary to install printers or modify existing printers in transit system terminals. The ongoing costs of requiring receipts in transit systems would be similar to those for vending machines. The delay in transaction time from printing a receipt would be a critical concern in transit systems.

In many face-to-face transactions, a receipt E-Payment Requirement may be less costly than in self service or transit applications. Retailers that accept credit cards or debit cards would have terminals that are designed to produce receipts. Clerks would be available to conduct the transaction and operate the equipment, so that any additional service E-Payment Requirement from requiring receipts would be negligible. These retailers would also generally provide receipts, even for small transactions. Thus, extra transaction time would probably not be an issue. In contrast, retailers such as newsstand operators, fast- food vendors, and some convenience shop owners—who typically have small transactions, accept only cash, and have short transaction times—might find compliance with a receipt E-Payment Requirement burdensome. They may not be accustomed to giving customers receipts. These retailers would have to purchase or lease terminals to accept payments from stored-value products, but the terminals may be more expensive because they contain printers. Ongoing costs of requiring receipts would include the power to operate the printer, paper to print the receipts, and labor to replenish the paper and repair occasional malfunctions of the printer. The delay in transaction time from printing a receipt may cause congestion in some cases and discourage adoption of stored-value products.

For many of the electronic stored-value products intended to be used as cash substitutes, corporates do not now assume any liability for loss or unauthorized use of stored value. These products can be used by anyone possessing the product. There is no PIN, nor is there any other authorization E-Payment Requirement associated with use. In some cases, the record of stored value is maintained only on a device (e.g., a chip card) held by the consumer.

Electronic stored-value products may be subject to errors from malfunctioning terminals or stored-value devices, in debiting the amount of transactions at the point of sale, and in

authorizing or refusing transactions. Stored-value products for which the issuer assumes no liability for unauthorized use may have more limited needs for error-resolution procedures than products.

E-Payment Requirements would subject issuers to a greater number of potential errors because of the possibility of errors in identifying authorized users. The likely increase in alleged errors attributable to liability issues would require additional employee time, data processing resources to determine debits against specific cards and ascertain the legitimacy of disputed debits, and possibly greater telephone capacity.

Most existing or planned electronic stored-value products do not provide periodic statements. The recordkeeping needs for this E-Payment requirement would be greater than those for the liability. Virtually all of the cost of the Employees, Hardware, Resources, paper and postage would likely be an incremental cost. Issuers of these products might also incur start-up and ongoing costs for increasing and maintaining the capacity to produce the greater number of periodic statements that the E-Payment Requirement might require.

Timing Issues

There is little evidence of consumer problems with electronic stored-value products at this time. Experience is quite limited, however. It is impossible to predict with much certainty whether or not problems will arise as these products become more widely used. The principal argument for early E-Payment Requirement is that providers of new products will know from the beginning that the products are regulated and what the E- Payment Requirement requires. With this knowledge, producers can take regulatory E- Payment Requirements into account when designing the product; they avoid the costs of designing a product first and then later having to change the product to comply with the E-Payment Requirement. Early E-Payment Requirement may also address consumers' concerns about a product and, by resolving their uncertainty, hasten acceptance of a new product.

The main arguments for waiting are that it is not known what (if any) problems will occur, regulators cannot foresee how new products will develop, and economies of scale make regulatory compliance more costly for new products (for which output is relatively low) than for mature products. E-Payment Requirement of new products may also have greater opportunity costs. Lacking insight on how the market for a new product will develop, regulators may prescribe costly E-Payment Requirements for problems that would not occur or mandate features that preclude products that consumers would value. It seems unlikely that regulators will perfectly foresee how markets for new products will develop and write a E-Payment Requirement for new products that would not need some later revision. Evidence on the cost of complying with changes in E-Payment Requirements is scarce. Activities such as learning the E-Payment Requirements of a E- Payment Requirement, evaluating existing disclosures and procedures, formulating policies to ensure compliance, training employees, and assessing how the E-Payment Requirement affects the bank's position in the market would have had to be performed even if no changes were required.

Other activities, such as designing new disclosures, revising procedures, and destroying obsolete forms, might not be completely fixed, but they likely would have substantial indivisible components, making their cost largely fixed once any change had to be made. These considerations suggest that costs of complying with later revisions may reduce any savings in operating costs from imposing E- Payment Requirement early in the product life cycle. E-Payment features accounts may have significant start-up and ongoing incremental costs in complying with E-Payment Requirement. Early E-Payment Requirement of electronic stored-value products may cause higher regulatory costs than later E-Payment Requirement because of economies of scale, the cost of revising E-Payment Requirements, and possible opportunity costs.

Benefits for Corporate

Lower costs. Electronic money eliminates the costs of handling coin and currency. The estimated cash handling cost for U.S. retailers and banks is over $60 billion annually, which includes costs associated with the processing and accounting of money, as well as storage, transport, and security. Electronic money brings greater efficiency to those tasks, offering substantial cost savings. Electronic money potentially provides merchants with cost savings resulting from: reduced collection and deposit float associated with coin, currency, and chequs, and faster funds availability; increased sales due to faster throughput at checkout counters and consumer tendencies to spend more with stored value cards; and increased self-serve transactions. Acceptance of electronic money would allow merchants to move more commerce from the physical world-to the Internet, which offers access to global markets at low cost. The continuing rapid decline in the cost of technology will increase the extent of these cost savings, enhance innovation, and further increase the attraction of electronic money and finance.

Reductions in some forms of fraud : While magnetic strip debit and credit cards can be overwritten or copied, smart cards are fitted with tamper-resistant chips and strong cryptographic protocols. Additionally, smart cards could be tied to biometric identification mechanisms, such as voice, hand, or retinal prints, to verify the identity of the user. To the extent electronic money displaces cheques, moreover, cheque fraud may be reduced. The new systems will be, however, targets of criminal activity. The new security measures would be hard to crack, thereby providing much more security and reliability to the users.

Greater Safety and Security : Another benefit electronic money offers merchants is increasing safety and security by eliminating some opportunities for theft. Electronic money could help curtail vandalism of vending machines, public phones, and the like, because there would be no coin or currency to steal. Similarly, owners and employees of retail establishments and other service providers who handle cash, such as taxicab drivers, could be much less vulnerable to robbery.

More Value Added Services : Electronic money technology, particularly smart card applications, could help sharpen merchants' offers of value-added services, strengthening customer relationships. For example. retailers could track customer activities (to an even

greater extent than they currently do with credit cards) to discern buying patterns and offer buyer-specific discounts and loyalty programs. These targeted promotions, also known as "micro-marketing," are generally viewed as more efficient than the mass-marketing techniques currently used. Some hard-pressed communities may benefit. If merchants did not need to collect and store cash, they might be willing to locate in areas that they now see as unacceptably risky.

E-PAYMENT SERVICES IN INDIA

In India, most of the e-Payment sites are via bank sites. Majority of banks are foreign or private sector, e.g., HDFC, Global Trust Bank, ICICI, Citibank. Also some of the non- Bank companies such as Global Tele-Systems have also entered the fray. Some years ago, Mary Meeker (Morgan Stanley Dean Witter's Internet analyst) forecast that financial services would be among the industries most profoundly affected by the Internet, since the distribution of financial products doesn't require any physical exchange of goods. The impact is bound to be higher and tougher for those in India as a slew of disturbances in the internal and external environment kept them so much preoccupied that they hardly got a chance to prepare themselves for the challenges of Internet that requires them to urgently and radically restructure their business model. In general, foreign and private banks are far ahead of Public Sector or Co-operative Banks in terms of the number of sites and their level of development. The private banks, with net-pro mindset seem all prepared to continue the "pathfinder" role in Indian Internet Banking. In the year 2002, a large sophisticated and highly competitive corporate Internet Banking Market will develop. Several factors as stated below will drive the increase :

- A lot of room to expand
- Increase in Internet usage to drive demand side pressure
- Emergence of open standards for banking functionality
- Growing customer awareness and need for transparency
- Global players in the fray

The number of Internet Banking sites should increase to over 200 by the year 2003. Entry level sites will fall from 55% to less than 10%. Advance sites should increase from 8% of the total to 33% of the total, which means a total of 60-70 fully functioning Internet Banks across the country. Internet is the change agent that is going to destruct the physical value chains of legacy banking and create a vastly more efficient digital value chain. All this is because of four major characteristics :

- No physical exchange
- Complete Transparency giving rise to perfectly Competitive Electronic Market place
- Customers' Supremacy
- Anytime anywhere access

Options for the banks

Most banks today are pursuing what might be described as fortress strategy, defending themselves against new entrants while waiting for more clarity in online world. The fortress strategy has the benefit of relying on traditional sources of advantage; it plays to strengths of current legacy banks. The risk is that these sources of advantage may not be enough to keep out new entrants that rely on a totally different business model.

Banks must today at least hedge by experimenting with the web business model. It needs the banks to fundamentally re-assess their opportunities for adding value and hence re-define their roles in the new paradigm. Banks must first determine what kind of web to target. Customer webs focus on maximizing a bank's share of wallet of a target customer segment while Market webs seek to aggregate a critical mass of buyers and sellers within one transaction category. Within any web, there are a number of possible roles a bank could play. Web shapers are one or two companies that own a shaping platform, take initiative to mobilize other companies around it, and define a set of standard practices to coordinate participants' activities.Other banks could be adapters and would need to define a clear niche that will help them differentiate themselves from other participants. Some adapters may become influencers, working closely with shapers to ensure the overall success of their web.

A short-term action plan could be:

- Define Internet strategy
- Implement Intranet to gain in-house experience with Internet technologies
- Pilot Extranets to support key product areas, e.g., Cash Management and Trade Services
- Invest in basic Corporate Internet infrastructure and 'back-end' e-banking infrastructure targeting functionality
- Increase functionality by successively adding Internet Banking products
- Proactively manage customer migration

Technological and market discontinuities are combining to generate rapid change and high uncertainty in banking. In such an environment, routinely to apply the strategies of the past may be the riskiest option of all. The challenge may not be very immediate but the future would see a spurt in the Internet Banking and me-too strategies would not work. This would pose serious questions regarding distribution channels, internationalization value focus and innovation. The winners may not necessarily be traditional banks and the key to success would be the banks, readiness to change and adopt fast changing customer needs. Recognizing the core competencies and configuring value propositions would determine how well the bank faces this challenge. It is an opportunity for those who can harness the power of this technology to reduce costs and offset the squeeze of spreads by greater volume and new services. Those who would choose to ignore, and stay embedded within their old business models, would better start counting their days. After all, it is better being ready, otherwise even the dinosaurs can face extinction.

CASE-1 :

Global Tele-Systems Ltd

Global Tele-Systems (GTL) has set up India's first payment gateway and also provides bill payment services. Since its inception, its business and scale of operations have evolved and grown substantially. Global Tele-Systems (GTL) began its operations as a trading company, supplying and servicing single-line phones, EPABXs, fax machines, modern key telephone systems, etc. It gradually moved to providing wireless communication systems, computerised telexes, multi-channel voice recorders, sophisticated communication software, computer peripherals, dealer boards, video conferencing equipment, etc. In line with its new business model, the company has reinvented itself as a global telecom and software solution provider in the past one year. At the beginning of this fiscal, the company's growth strategy was to be a services-oriented company and capitalise on its key strengths to provide solutions on a worldwide basis. GTL's business model is based on four basic needs of an enterprise. GTL has aligned its strategic business units (SBUs) in line with the needs. The company has four SBUs, namely, Telecom Infrastructure, Telecom Networks, Software and E-commerce and Application Services.

The telecom infrastructure group caters to the infrastructure connectivity. This SBU leverages GTL's alliances with global manufacturers like Nortel, Lucent, Ericsson, etc., to give value-added services to the end user. GTL has gained expertise in cellular, wireless, satellite and fibre optic networks for providing turnkey telecom infrastructure solutions. With the opening up of long distance telephony and increased emphasis on infrastructure development, this division is bound to make gains. Telecom Networks group provides various services like voice and data networks, call center solutions, unified messaging solutions, audio and video conferencing solutions, multimedia networks, facilities management, etc. With the increased thrust on corporate networks, this division has the requisite expertise to offer the solutions.

GTL's Software and E-commerce group follows a different business model than a software services company. It acquires software rights from international vendors by paying them upfront and markets the licensed copies of the same in India. It also creates derivatives of the core product and adds value to it by making it web-enabled or platform-independent. Besides, it also provides e-commerce solutions and IT consulting along with software and product development. Its focus is on offshore activities, project implementation and niche markets. Application Services is the fourth SBU of GTL. This SBU provides solutions on the technologies of the future. After setting up India's first payment gateway, it has started providing bill payment services. It provides shared user services like strategic outsourcing and ERP online.

Global had a 13% stake in Global Electronic Commerce Services (GECSL). It recently divested its equity stake in GECSL (1.26% of GECSL's equity) at Rs 250 per share aggregating to Rs 50 crs. The amount will be utilized for part repayment of its outstanding loans. GECSL has an ISP license. It builds and maintains enabling infrastructure for business-to-business (B2B) e-commerce. It is also the country's largest provider in the electronic data interchange business.

A payment gateway is a necessary middle link for e-commerce to succeed as it is used to make payments for goods and service transactions. The payment gateway will allow third-party transaction processing for enabling inter-bank business-to-business (B2B), business-to-consumer (B2C) and other e-commerce transactions over the Internet. GTL has tied up with various banks like HDFC Bank, Citibank, Deutsche Bank and Dena Bank. Another six major banks are expected to join by the end of this fiscal. GTL is targeting another ten banks soon.

GTL recently acquired exclusive country rights from GE Information Services (GEIS) to market its product, TPN Post, a secure B2B Internet-based electronic purchasing service for $ 1 million. GEIS is a global leader in business to business (B2B) e-commerce solutions. GTL currently manages all of GE India's Internet backbone operations. As per the terms of the agreement, GTL can sell this solution in India for six years. GEIS will provide complete technical support for the services. GTL has also made an agreement with Cincom Systems Inc of the US for software development and support services for it's worldwide clients. With this agreement, GTL will provide sales and support for Cincom's computer telephony integration and customer relationship management software in Australia and rest of the world.

GTL is presently in the stage of finalising a 50:50 joint venture with Crest Communications to offer media network services covering entertainment, information and education. The venture is proposed to develop a portal whose content will be delivered through a cable network developed by GTL. Global's area of focus will be on e-commerce, IT-enabled services and Internet-related technologies. Acquisitions, tie-ups would be pursued aggressively to encash on the opportunities. Global sees itself as a e-services company. The company has plans to completely exit consumer telecom business and it is focussing itself on e-commerce and application service business.

Payment Gateway of GTL

The pilot project for setting up the payment gateway infrastructure (PGI) over the Web is promoted by Global Tele-systems Ltd (GTL). The company has targeted 10 banks to utilise the payment gateway by the end of this financial year. GTL has tied up with HDFC Bank, Citibank, Deutsche Bank and Dena Bank. Six more banks would join the consortium for utilising the gateway by the March end. They are targeting at least 10 more banks to join in by the end of the year. The State Bank of India has opted out of participating in any payment gateway as the bank is still to achieve full inter-branch connectivity. The payment gateway will provide third party transaction processing for enabling inter-bank, business-to-business (B2B), business-to-consumer (B2C) and other e-commerce transactions over the Web. The infrastructure will enable inter-bank fund transfer over the Internet for settlement for the next day.

The gateway will also support B2B models based on supply chain management and manufacturer-vendor relationship. On the B2C side, it will enable web shopping, utility bill payments and financial portals for marketing retail products. The IPS payment processor/ switch developed by GTL will serve as the central point for enabling fund transfer among

participating banks on a real time gross settlement basis.The settlement of inter-bank transactions will occur on a real-time basis, though clearing of transactions will continue to be routed through the clearing house of the RBI.

Although ICICI Bank has initiated plans of launching a parallel payment gateway for inter-bank transfer and settlement of funds and support other e-commerce transactions, the new generation private sector bank has reportedly approached a number of other banks to join its gateway. However, these banks are reluctant to tie up with ICICI Bank as they feel that transaction processing through its network may lead to compromising on data and other information of their customers. In such a situation, only a third party transaction processing house, which is data neutral to all banks stands out as an ideal choice and the pilot runs are presently going on for HDFC Bank and Citibank. The gateway supports multiple payment models for various banks simultaneously. Transfer of funds can be made through credit, debit or smart cards and cheques, with the IPS payment switch enabling the transactions. The gateway will function on a system for enabling authentication and certifying of transactions with firewalls against misuse in place. The gateway will enable bank customers to log on to the web commerce server of GTL, which sends the payment instruction to the IPS processer. The message is transmitted to the payer's bank and upon authentication this is across to the payee's bank. Upon confirmation from the payee bank, the transaction is settled. Subsequently, both banks convey the transaction to the RBI's clearing house, which clears the transaction.

SWOT for Global Tele-system

Strengths :

1. It has inter-bank payment gateway which is much more advantageous because it can make transactions between lot of financial institutions which is much more convenient than intra-bank transactions.
2. It has its own networks and infrastructure which gives it a lot of flexibility in terms of services it can provide while at the same time giving cost advantage.
3. It has tie-up with major companies such as GEIS for payment solutions and is also acquiring companies in US for further consolidation. Thus, it now has international presence.
4. The company is moving up the value chain by providing enterprise wide solutions which has improved its image from just a telecom hardware company to solution provider.

Weakness :

1. The payment gateway is still in trial stages with many dot.com companies such as Krishi.com running trials on the system.

2. Companies such as ICICI have already started their services thus denying Global first mover advantage.
3. The company has one of the lowest brand equity among the major electronic payment and banking companies such as Citibank, HDFC, Global Trust Bank, etc.

Opportunities :

1. There is a Net boom in India and abroad and many e-commerce sites such as krishi.com, jaldi.com, etc., are tying up with payment gateways to enable their sites to conduct electronic payments.
2. It can offer Corporate payment gateways along with services such as VPN, Network Management, etc., so as to give one shop solution to its customers.
3. It can tie up with lot of dot.com companies for trial basis as it can act as a third party transaction, which would be acceptable to most of companies and banks.
4. It can also have a direct tie-up with Credit Card majors such as VISA which would expand its customer base substantially while giving it a lot of credibility.
5. It can have tie-up with banks which can be done easily as it is from a non-competing sector. This would expand its base of operations.

Threats :

1. There are large numbers of banks, which are offering e-Payment solutions, and they are better-entrenched and well-known than Global.
2. There is another danger that some world major may set up operations in India with same spectrum of service as Global since it is an extremely lucrative area and an expanding one.
3. Already ICICI has a head start over Global in providing payment gateway. This coupled with ICICI's brand equity presents formidable challenge.

CASE-2 :

ICICI Bank

The bank is a 74 % subsidiary of ICICI. It currently has a branch network of 55 and an additional 9 extension counters. Out of the 55 branches, 25 are in metros, 13 in urban centres and 17 in semi-urban and rural locations. 891 employees currently staff it. ICICI has emerged as one of the fastest growing banks within the private-sector banks with a growth rate in total income in excess of 100%. This has been aided by an aggressive branch expansion strategy.

Commercial Banks provide banking services and finance working capital. Historically, Indian banking sector had been highly regulated. Though a large part bf lending /investment is still directed by the RBI, last 6 years of reforms have dramatically changed the environment. Lending and interest rates on domestic term deposits have been freed. Accounting disclosures and income recognition / provisioning norms are made stricter. Banks have to be adequately capitalised in line with international standards. Banks are allowed to provide long-term loan, and take up leasing and other financial services. New private banks are IT savvy enabling them to be more efficient.

The bank has a competitive edge in the corporate banking market due to the relationship, which ICICI has with most major corporates in the country. ICBA has also emerged as a prominent player in the retail-banking segment by virtue of large investments in technology. This has allowed it to offer superior services to its clients. The bank is being driven to a large extent by the strategy of the parent to emerge as a universal bank. The bank's parent has emerged as the most aggressive players in the wholesale lending segment. While the parent is trying to concentrate on the large-size clients, it is using ICBA to tap the smaller corporates and the retail clients. It seems only a matter of time before the bank gets merged with the parent.

As a reflection of continued commitment to adopting cutting edge technology, they recently consolidated a server system by purchasing the Starfire Server from SUN Microsystems. This server is the only one of its kind in India, and will help offer uninterrupted and efficient service to rapidly expanding customer base. The focus on customer convenience was manifested in the launch of India's first internet-enabled credit card, which also offers other unique value-added features including preset spending limits for each member of the family. They also recently launched an online trading facility for retail customers, which is expected to be operational shortly.

Electronic Commerce is set to revolutionize the way business is conducted in the future. ICICI is gearing itself to be at the forefront of the e-revolution in India. They launched i-payments - a pioneering B2B Internet based solution, which seamlessly integrates our clients with their vendors and suppliers in a closed payment loop, thereby facilitating superior inventory and receivables management. They have also launched an online utility bill payment system for Internet Banking customers, and have tie-ups with several utility service providers in the major Indian metros. They are presently working on an open loop payment gateway, in collaboration with a Compaq led consortium, which is expected to be a significant driver to future customer acquisition. Going forward, ICICI Bank would continue to consolidate capital resources, adopt a focused customer-centric approach, and maintain thrust on technology adoption and innovation. They will combine in-depth industry knowledge with their specialized structuring skills to offer clients financial solutions tailor-made to ensure they derive the maximum benefit from market opportunities.

ICICI Payment Gateway

ICICI will be the first financial intermediary to implement an e-Commerce payment gateway within India and will be providing services to corporates, consumers, merchants and banks that plan to share the ICICI Payment Gateway. ICICI's B2C payment gateway will interface between the Internet shopper, the web merchant and banking systems in a secured environment to facilitate online payments. The Gateway offers the flexibility of multiple payment modes including credit, debit & smart cards, direct bank debits and e-cheques. The Gateway will use strong encryption technologies and digital signatures to protect these transactions from potential attacks by hackers.

ICICI's B2B Payment Gateway will facilitate e-Commerce transactions between corporates in a virtual market place. The Gateway would also provide e-procurement services by linking corporates with their network of buyers and suppliers. The Gateway will allow processing of innovative payment instruments like e-cheques, purchasing cards, direct debits and on-account payments. The ICICI e-Commerce Payment Gateway will launch a state-of-the-art Internet payment system and is set to open the world of e-Commerce to many more merchants, consumers and businesses in India by significantly lowering the cost and complexity of enabling secure transactions over the Internet.

The Gateway will provide easy integration with merchant Shop & Buy Applications and back-end systems through a thin "Payment Client" - an XML client software residing on the merchant server. Apart from processing online transactions, the Gateway would also provide merchants with an administrative module for transaction management, offering a high degree of flexibility for merchants. The ICICI Gateway will support credit card ransactions secured by using Secured Socket Layer (SSL) technology, the most commonly used security standard on the Internet today. Further, the Gateway has the flexibility to support Secured Electronic Transaction (SET) standards.

ICICI Group has launched a number of strategic initiatives on the Internet such as e - Invest - India's first Internet stock trading service. ICICI Bank, the banking subsidiary of ICICI and the pioneer of Internet Banking in India, has introduced several Internet based services which include online opening of bank accounts for NRI customers; the first pan - India Internet based bills payment system; Money 2 India - a remittance product for NRIs, etc. ICICI Bank has entered into agreements with leading corporates for B2B and B2C solutions and has recently signed a memorandum of understanding with Satyam Infoway Limited (Nasdaq: SIFY) for online distribution of Banking products.

SWOT Analysis for ICICI Bank

Strength:

1. Major Bank with presence all over India.
2. It has low cost of development for software as it's software division has been in operation for more than first year.
3. It has a highly proactive bank. It comes out with innovative schemes regularly and is highly regarded by it's competition.

4. It was the first bank to come out with electronic payment gateway. It has tied up with Rediff for service called ICICI Infinity which makes it easier for customer to make payments online.

Weakness:

1. The bank has major presence in metros only.
2. The payment Gateway is applicable only for intra banking transactions.
3. The cost of acquisition of security software and ISPs is quite high and may act as a deterrent to more security features.

Opportunities:

1. More and more NRI population is making transaction over the Net. By account of ICICI this number is nearly 50,000 at the moment and growing rapidly.
2. The Indian population itself is using the Net for transaction. By ICICI estimates itself, the number is nearly 30,000 and growing at a fast pace.
3. There is a Net boom in India and abroad and many e-commerce sites such as Rediff, Fabmart, etc., are tying up with payment gateways to enable their sites to conduct electronic payment.
4. The life styles of people are changing and they would like to have the convenience of conducting their transactions and doing shopping online which is a great boon to service providers like ICICI.

Threats:

1. Competition from other banks and service providers such as Citibank (Suvidha), HDFC, Global Trust Bank is hotting up.
2. The security features that are provided may not be enough and may be susceptible to hacking which may prove detrimental to e-Payments.

CONCLUSION

Electronic money systems are still in the relatively early stages of development, and the timing of many future developments is likely to be slower than some people expect, for there are many obstacles to growth. These include issues relating to interoperability, security and privacy, and transaction verification and authentication. Government agencies should continue to monitor consumer concerns and industry initiatives. Law enforcement needs for information can affect privacy interests of consumers and merchants, as well as the technical standards that provide the security, transaction verification, and authentication of computerized messages. Specification of consumer rights and responsibilities can affect consumer confidence and acceptance of electronic money products. Consequently, in meeting its responsibilities, industry and government must combine patience with aggressive fact-finding study, and coordination among government units both nationally and

internationally. The scope of the study was limited to the analysis of products that have been launched recently or currently approaching their commercial launch date. While an array of potential products has been proposed and publicised, in many cases these products are still in the early design or pilot phases; as a result, insufficient information is available to assess their features. In the area of software-based systems, in particular, fewer proposed products are nearing commercial introduction than in the case of credit cards with hardly any product being likely to be launched in India soon. Thus, it was not possible to examine in any detail the specific features and likely implementation aspects of such products. It should be noted that software-based products that are most likely to become commercially available in the near future for use over open computer networks would function as access products to credit card accounts or bank deposit accounts.

REFERENCES

1. www.icici.com
2. http://www.gtl.co.in
3. www.cio.com
4. www.anu.edu.au/people/Roger.Clarke/EC/
5. www.brint.com