

UNIT V

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E-MAIL

Every day, the citizens of the Internet send each other billions of e-mail messages. A dozen or more e-mails are sent each day online without even thinking about it. Obviously, e-mail has become an extremely popular communication tool.

The first email message was sent in 1971 by an engineer named Ray Tomlinson. Prior to this, you could only send messages to users on a single machine. Tomlinson's breakthrough was the ability to send messages to other machines on the Internet, using the @ sign to designate the receiving machine.

An e-mail message has always been nothing more than a simple text message, piece of text sent to a recipient. In the beginning and even today, e-mail messages tend to be short pieces of text, although the ability to add attachments now makes many e-mail messages quite long. Even with attachments, however, e-mail messages continue to be text messages quite long. When there is an e-mail client on your machine, you are ready to send and receive e-mail. An e-mail server is needed for the client to connect.

Attachments - E-mail client allows one to add attachments to e-mail messages you send and also lets you save attachments from messages that you receive. Attachments might include word processing documents, spread sheets, sound files, snapshots and pieces of software. Usually, an attachment is not text (if it were, you would simply include it in the body of the message). Since e-mail messages can contain only text information, and attachments are not text, there is a problem that needs to be solved. In the early days of e-mail, you solved this problem by hand, using a program called uuencode. The uuencode program assumes that the file contains binary information. What uuencode produces, therefore, is an encoded version of the original binary file that contains only text characters. In the early days of e-mail, you would run uuencode yourself and paste the uuencoded file into your e-mail message. The recipient would then save the uuencoded portion of the message to a file and run uudecode on it to translate it back to binary. The word "reports" in the first line tells uudecode what to name the output file.

Modern e-mail clients are doing exactly the same thing, but they run uuencode and uudecode for you automatically. Considering its tremendous impact on society, having forever changed the way we communicate, today's e-mail system is one of the simplest things ever devised. There are parts of the system, like the routing rules in send mail, that get complicated, but the basic system is incredibly straight forward. The next time you send an e-mail, you'll know exactly how it's getting to its destination.

INTERNET

The internet is a world-wide collection of computer networks. It provides access to communication services and information resources to millions of users around the globe. This network of networks, or "internet", is a group of two or more networks that are :

interconnected , capable of communicating and sharing data with each other, able to act together as a single network. The machines on one network can communicate with machines on other networks, and send data, files, and other information back and forth. The internet covers the globe and includes large, international networks as well as many smaller. Local Area Networks (LANs). It is not owned by any individual, company or country.

The Internet offers access to data, graphics, sound, software, text, and people through a variety of services and tools for communication and data exchange. Some of the services are :

Remote login (Telnet)

File transfer (FTP)

Electronic mail (e-mail)

News (USENET or network news)

Hypertext (WWW)

Internet is the cheapest and fastest means to (a) Get information (b) Provide information (c) Compile information.

(a) Getting Information on the Internet. The amount of information available through the Internet is staggering. To make all of it more easily available to users, programs such as the Gopher were developed to help present material in some logical fashion. The most recent and very successful attempt at presenting information over the Internet is the World Wide Web (WWW). You could get information about people, products, organisations, research data, electronic versions of the printed media, etc. from the Internet.

(b) Providing formation on the Internet. Most of what you want to provide could be considered advertising-perhaps the best and inexpensive way to let people know who you are, what you are doing/have done, and how. For an organisation of institution, setting up a home

page is a good way to let the world know what its products and services are. In addition to advertising, the other critical functions that relate to provision of information are - **Publishing**, including full text articles, reports, illustrated articles, abstracts, computer programs, and demonstrations. **Extension**, in which some of the delays associated with the print media, may be reduced. **Teaching**, The possibilities here include both distance learning and assistance for students.

(c) **Compiling Information from the Internet.** This is another form of getting specialised information. For instance, if you wanted to poll the readership for a Magazine or conduct a survey to detect the pulse of a select community, the web provides you with the ideal platform and opportunity. Using forms, e-mail, etc. you can conduct surveys, get opinion of people across the world. There are hundreds, of discussion groups and Listservers, where one can post a question and get it answered by hundreds of people who participate in these discussions.

To become successful in today's competitive world one has to manage the future. Managing the future is achieved by managing information. Internet is a vast source of information. It 'is the window to the Information Superhighway. A couple of years back, Internet connectivity in India was the privilege of a few educational institutions, research organisations and corporate houses. 'Thanks to liberalisation, now Internet is accessible and affordable to almost everyone. India is seeing the Internet boom. So irrespective of the profession, age, sex and education, if one wants to be successful, he/she has to become an Internet literate - an Internet.

Capabilities of Internet

Some of the fundamental capabilities of the Internet or the WWW are as follows:

Global Dissemination. With connectivity in over 100 countries, international communication is a fundamental facet of the web.

Customisation. Information can be maintained centrally on a network server and still be displayed, accessed, and disseminated on an individual basis.

Interaction. Two-way or multi-channel communication is possible on the net. Immediate and focused feedback from customers and forward on-line customer queries to appropriate internal resources so that appropriate action can be taken.

Collaboration. Seamless access to shared data, project coordination, and coordinated

information management resulting in enhanced opportunity for joint development and innovative products and services.

Electronic Commerce. Support for on-line ordering, purchase orders, inventory, and delivery tracking.

Integration. You can link on-line activities with internal, back-end processes for maximum impact, distribute information and customer interaction across functions, and promote new business applications.

ELECTRONIC COMMERCE

Businesses are incorporating electronic commerce into strategic plans, business schools are incorporating it into their curriculum, and consulting and software firms are marketing electronic commerce “solutions”. Electronic commerce is defined as -

The use of electronic transmission mediums (telecommunications) to engage in the exchange, including buying and selling,-of products and services requiring transportation, either physically or digitally, from location to location.

EDI is a subset of electronic commerce, A primary difference between the two is that electronic commerce encompasses a broader commerce environment than EDI. Traditional EDI systems allow pre-established trading partners to electronically exchange business data. The vast majority of traditional EDI systems are centered around the purchasing function. The EDI systems are generally costly to implement. The high entry cost precluded many small and mid-sized businesses from engaging in EDI. Electronic commerce allows marketplace to exist where buyers and sellers can “meet” and transact with one another.

Potential Benefits of Electronic Commerce

In order for businesses to invest resources to engage in electronic commerce, the benefits must exceed the costs. Benefits that a businesses can potentially gain from engaging in electronic commerce. Internet and web-based electronic commerce is more affordable than traditional EDI ;

1. Internet and web-based electronic commerce allows more business partners to be reached than with traditional EDI
2. Internet and web-based electronic commerce can reach a more geographically dispersed customer base
3. Procurement processing costs can be lowered
4. Reductions in inventories
5. Lower cycle times

6. Better customer service ; and

7. Lower sales and marketing costs.

Businesses are not the only benefactors of Internet electronic commerce , consumers may also reap benefits from using the Internet. Some benefits that consumers may expect to receive are :

1. Increased choice of vendors and products ;
2. Convenience from shopping at home or office ;
3. Greater amounts of information that can be accessed on demand ;
4. More competitive prices and increased price comparison capabilities ; and
5. Greater customization in the delivery of services.

Electronic commerce strategies need to be formulated so that they help a business achieve its overall business goals. Environmental changes may cause a business to rethink or adjust its missions and goals, such as the entrance of “new” competitors into the marketplace. These “new” competitors may arise from previously unknown businesses, unknown perhaps because they are located in foreign countries. These “new” competitors may launch ; web-based commerce site and have a newly found ability to cost-effectively draw customers away from the business. Once the corporate mission and goals are set, then the information systems and technology group’s mission can be set to help accomplish that mission. Ultimately, a web-based electronic commerce plan can be set.

THREE PILLARS OF ELECTRONIC COMMERCE

Three electronic, pillars support open market processes: electronic information, electronic relationships and electronic transactions. Thus, this model builds on the existing market space and utilizes electronic mechanisms as an enabler of supporting open market processes.

(i) Electronic Information. The WWW is viewed as a “global repository” of documents and multimedia data. Constructing an electronic information pillar is easy , most word processing software packages will easily convert documents into a web-readable format. The challenge is to construct a good, solid pillar that will not crumble, or in WWW terms, the web page does not freeze-up or links do not lead the visitor to a dead end or having them wandering through a maze of links without easily finding the necessary information. Thus, the construction of the electronic information pillar should adequately support the objective of an open market. The retrieval of the desired electronic information is the cause of frustration to many web “surfers”. Search engines and other intelligent agents are increasing in popularity to assist users to more efficiently and effectively navigate the WWW.

(ii) Electronic Relationships. Placing information on products and service offerings on a web site does not mean that potential customers or guests will visit that web site a first time, and it especially does not mean that a user will return to the site. The electronic relationships pillar is about building a site that has the feeling of being a “port of entry” into a community. Having entrants pass through this port of entry on a somewhat regular basis is the key to successfully engaging in electronic commerce. In order to attract users over and over again to a site (which also means away from other sites), the site needs to have certain features; it must be innovative ; add value ; provide information and interaction not otherwise available ; and create forums for opinion-building activities.

Another feature of electronic commerce like other mediums, such as print and broadcasting, is that it is interactive, and users expect to experience interaction when they visit a site. In order to build good customer relationships, electronic commerce web sites need to be designed to give potential customers the feeling of community and interaction they are increasingly expecting.

(iii) Electronic Transactions. The third pillar is the electronic transactions pillar. Many businesses have built an electronic information pillar and some have built or are building an electronic community pillar, but substantially fewer have constructed the electronic transaction pillar. Two impediments to constructing the pillar exist: the ability to engage in meaningful and sufficient negotiation processes and security of transaction data.

E-COMMERCE APPLICATIONS

E-commerce applications can be broadly classified into the following categories, depending upon the extent, scope and functionality of these applications :

- (i) Business to Consumer (B2C)
- (ii) Business to Business (B2B)
- (iii) Customer to Business (C2B)
- (iv) Customer to Customer (C2C)

(i)Business to Consumer (B2C). These are those applications, which make business come closer to the consumers or customers and vice versa, in order to offer an attractive electronic market place, where products and services can be sold and purchased. This business is done by providing well designed web sites, which are like our normal shops in the market, with the products & services to be sold, displayed with description and price. For designing these sites, which can be seen with the help of browsers, multimedia content along with hypertext and hyper media are used. These applications, are not only the sources of trade, but also act

as supporting activities, which may help to generate revenue. Some of the examples of these type of E-commerce applications are shopping sites, Home banking, Entertainment services like video on demand, movies, games, etc., Educational services like web based training, virtual class rooms, market research etc.

(ii) Business to Business (B2B). Business-to-business electronic commerce involves “Internet-enabling” of existing relationships between two companies. Clusters of buyers, sellers, and intermediaries in already mature industries are banding together to build extranets. A business-to-business extranet is a secured business network of several cooperating organizations, typically operated through a VAN. The WWW is a wonderful opportunity to streamline, automate, and standardize many of a firm’s relationships with suppliers, distributors, and partners. A well-crafted extranet can offer a business and the ‘companies with whom it does business many of the benefits of an electronic data interchange system, without many of the drawbacks. Moreover, it enables trading partners, suppliers and customers with common interests to form a tight business relationship.

(iii) Customer to Business (C2B). In C2B model, customer interacts with information databases such as product catalogues, price information, configure the product, compare the cost, place the order and have it delivered after electronic payment process. The products like computers, books, CDs, music systems and different services are purchased through E-business application. Bill payments are a big application of C2B model. The electronic mail, video conferencing and news groups are other big applications where information is shared through electronic communications.

(iv) Customer to Customer (C2C). In C2C model, E-business revolves around two individuals who deal with each other in their individual capacities and play a designated role as buyer/seller, teacher/student, manager/officer, brother/sister. E-mailing, sending E-greetings, payments, model applications. , payments, ordering and sending gifts are the C2C model applications.

Electronic Communications Systems - One way people interact is by meeting together. Meetings can be supported by equipping conference rooms with computers and sophisticated software. Alternatively, videoconferencing and desktop conferencing enable people to meet without physically moving. Another way people interact is by speaking, which computers support with voice mail and voice annotation. People interact by writing, supported by collaborative writing tools and electronic mail applications. Electronic bulletin boards and news-groups support broader communications.

Electronic communications systems are the central nervous systems of today's organizations. Electronic mail, voice mail, bulletin board systems, and facsimile allow organizations to send messages in text, video, or voice form or transmit copies of documents and do it in seconds, not hours or days. Such systems transmit and distribute text and images in electronic form over telecommunications networks. This enhances the communications and coordination among work group and organizations. Electronic communications systems help reduce the flow of paper messages, letters, memos, documents, and reports that flood our present inter office and postal systems. However, in many cases, this paper flood has become an electronic one.

Intranet E-business requires a network platform, which is seamless and allows smooth flow of data and information in any form from any location to any other destination(s). The Intranet is essentially an internal company network that uses internet standards, namely HTML (Hyper text mark-up language), HTTP (Hyper Text Transfer Protocol) and TCP/IP (Transmission Control Protocol/Internet Protocol). The existing network (LAN/WAN) when loaded with these standards and supported by web server and web browser becomes Intranet for the organization. Intranet is meant for users from the organizations. The normal network (LAN/WAN) is able to handle database applications in client/server architecture, the same network when converted as Intranet can handle text and multimedia applications. The Intranet is not accessible to the people outside the organization. The Intranets are used within the organization for following purposes :

Access Manuals, contracts, Post personal web Pages, Access product, customer data, Post job offers, Memos, Revision, validation, approval of documents, Access databases, access schedules, plan, calendars, access employee database.

Intranet deals with internal information needs of the people in an organization. It does not give access to external world. Hence, people outside the organization cannot access this information. Although intranets and internets share most of the same technology, they differ in a number of basic business goals and tactics.

Applications of Intranet - Sales and Marketing Intranets, Research and Development Applications, Improving Customer Service and Technical Support, Human Resource Applications, Accounting Applications etc.

Extranet - "Intranet is private to the organization. Extranet is an Intranet for outside authorised users using same internet technology. The outside users are trusted partners of the organisation who have access to information of their interest and concern. For example, in auto-industry spare parts manufacturers have access to inventory database and production

Schedules used to plan and ship the required spares to factory location. Dealer/Distributors have access to product files such as catalogues, product Specifications, pictures, images, etc. to answer queries of the customer. When intranet crosses the logical boundary of the organization and provides secured access to selected data and information of the organization, the intranet becomes Extranet.

THE WORLD WIDE WEB -The World Wide Web—known simply as the web, or sometimes referred to as WWW or W3—is actually another information retrieval tool similar to gophers, Archie, and WAIS. However, the web has an enormous impact on the commercial use of the Net. The Web is attractive, is easy to use, and lends itself to publishing or providing information to anyone interested. Those who offer information through the web must first establish a home page—a text and graphical screen display that welcomes the user and explains the organization that as established the page. For most organizations, the home page will lead the user to other pages, with all the pages of a company being known as a Web site. While the other methods of locating information on the Net are text-based, the web pages have made such a dramatic impact by combining text hypermedia, graphics, and sound., Together they can handle all types of digital communication while making it easy to link resources that are half-a-world apart.

Teleconferencing - Teleconferencing means any kind of multi-way communication carried out in real time using telecommunications or computer networks and equipment. There are three principal types of teleconferencing

- (1) Video conferencing
- (2) Audio conferencing
- (3) Data conferencing

(1) **Video conferencing.** Video-conferencing enables real-time communication over a distance by allowing people at two or more sites to communicate with each other, not just by hearing each other's voices as with a conventional telephone, but by seeing a video picture of the people at the other sites. Each site has one or more cameras, microphones, loudspeakers and monitors. It aims to create a sense of a person at a distant site appearing to be there in the same room, an affect that has been called

(2) **Audio conferencing** - Audio-conferencing provides an audio link similar to that of a conventional telephone, except that it offers much higher quality audio and enables more than two sites to be linked together. Using hands-free audio units sophisticated echo-cancellation software, with sensitive microphones and audio-conferencing enables communication between groups of participants rather than just individuals.

(3) Data Conferencing. Data conferencing is the connection of two or more computer systems, through which information flows, 'This information can be in the form of text, graphics, digitized sound, or digitized video, WC may be considered a type of data conferencing. However, sound and video are not necessarily required for data conferencing. White boards or applications which allow multiple computer to add, remove, or edit documents simultaneously, are an example of data conferencing without sound and video.

Difference between B2C and B2B e-Commerce

For one thing, the customers are different-B2B customers are other companies while B2C customers are individuals. Overall, B2B transactions are more complex and have higher security needs. Beyond that, there are two distinctions :

1. Negotiation. Selling to another business involve haggling over prices, delivery and product specifications. Not so with most customer sales. That makes it easier for retailers to put a catalogue online, and it's why the first B2B applications were for buying finished goods or commodities that are simple to describe and price
2. Integration. Retailers don't have to integrate with their customers' systems. Companies selling to other businesses, however, need to make sure they can communicate without human intervention.

The major challenges of B2C e-commerce are :

1. Getting browsers to buy things - Your e-commerce site cannot live on traffic alone. Getting visitors to the site is only half the battle. Whether they buy something is what determines if you win. The so-called conversion rate for B2C e-commerce sites is still fairly low. Some ways to boost your conversion rate include improving navigation, simplifying checkout process (such as onestep checkout and easily replaced passwords), and sending out emails with special offers.

2. Building Customer Loyalty-With so many sites out there, how can you build a strong relationship with customers? Here are some tips: a) Focus on Personalization. A wide array of software packages are available to help e-commerce sites create unique boutiques that target specific customers. Amazon, which built its own personalization and customer relationship management (CRM) systems, is well known for its ability to recognize customers' individual preferences. Create an easy-to-use customer service application. Providing just an e-mail address can be frustrating to customers with questions. Live chat or, at the very least, a phone number will help. Focus on making your site easy to use.

(c) Fulfilment - E-commerce has increased the focus on customer satisfaction and delivery fulfilment. Providing instant gratification for customers still isn't easy, but successful B2C e-

commerce operations are finding that fulfilment headaches can be eased with increased focus and investment in supply chain and logistical technologies.

ELECTRONIC DATA INTERCHANGE (EDI) –

Traditionally, the transfer of data from one company to another has been by paper documents. This is known as a paper-based system. These documents have to be manually forwarded and entered to the destination computer. EDI is the electronic exchange of structured business information, in standard formats, between computers. EDI eliminates the need for a paper-based system by providing an electronic link between companies. This reduces data entry tasks and improves business cycle times.

EDI is the electronic transfer of structured business documents in an organisation-internally among groups of departments or externally with its suppliers, customers and subsidiaries. The documents likely to be used in EDI are invoices, purchase orders, shipping requests, acknowledgements and payments. EDI is quite different from generic correspondence like e-mail and involves the exchange of specific management and tracking ‘procedures designed to efficiency. In EDI information is passed electronically from one computer to another over a network without having to be read , retyped or printed. The information must have a defined structure agreed between your company, or group you send and receive data from.

Any company or group which uses EDI is called a trading partner. The system, which routes them to the appropriate receiver’s computer. The computers that different trading partners use do not have to be from the same manufacturer. The information that EDI handles includes, for example, purchase orders and invoices. However, any type of business document can be sent, providing it conforms to current industry, national or international format standards. Examples of current uses of EDI include automatic teller machines (ATMs) in banks where EDI is used for transferring and withdrawing funds between different bank accounts, airline reservation systems, stock exchange transactions and car reservation systems.

Working of EDI. Regardless of format chosen, companies using EDI communicate with their trading partners in one of two ways : Either they exchange data with several trading partners directly or they interact with multiple companies through a central information clearing-house.

In the latter case, all transactions are funnelled through a third party’s computer This enables the sender to communicate with an unlimited number of trading partners without worrying about proprietary systems, audit trails, variable transmission speeds, and general computer compatibility. Basically, here is how EDI works :

1. Prior to any computer work representatives of two companies interested in exchanging data electronically meet to specify the applications in the EDI standard which they will implement.

2. Each company adds EDI programs to its computer to translate company data into standard formats for transmission, and for the reverse translation on the data it receives.

3. Then, as often as operationally required the two companies exchange data electronically in the standard formats.

The data transmitted originates from records in the sender's data base after the sender confirms that the receiver is an authorized recipient for such data. The sender composes a transmission formatted in the EDI standards; the receiver translates the formatted message to a computer record to be processed and used internally.

All transmissions are checked both electronically and functionally and the protocol includes procedures for error detection and correction. Once a company has established standardized communications with another company, it is now in a position to communicate with any other company that is also using the EDI standards.

EDI BENEFITS

The demonstrated benefits of EDI include reduced inventories, reduction in purchase and payment overheads and faster reaction times. However, there is an intangible benefit of EDI that cannot be measured in percentages-improved business relationships with trading partners. EDI is attractive because apart from eliminating paper and manual processing, if implemented properly it can reduce the cost of doing business by as much as five percent of net sales. A complete cost-benefit analysis of EDI should also include the value of increased market share that EDI may bring.

EDI provides many significant business benefits, include :

1. Marketing competitiveness
2. Administrative cost savings
3. Shorter time to market
4. Better quality control
5. Improved corporate trading relationships .

Leading organisations around the world are making strategic use of EDI for real cost savings. Eg.Caterpillar Inc., the world's largest manufacturer of earth-moving equipment has a reputation for moving fast to beat worldwide rivals, especially Japanese firms. Caterpillar relies on an X.25 based EDI network to link its supplies around the world. At Digital's manufacturing plant in Augusta Maine, EDI has reduced the cost of generating an average purchase order by 25 percent. The time to process the order has shrunk from 5 weeks to 3 days. Digital's MRP system here is directly connected to the production scheduling system of their supplier, Motorola Corporation in Phoenix. The two companies

increased their trust and reliance on each other to the point where Digital no longer sends purchase orders, but sends forecasting.

ELECTRONIC PAYMENT SYSTEMS

Electronic Payment Systems are becoming central to on-line business, process innovation as companies look for ways to serve customers faster and at lower cost. Emerging innovations in the payment for goods and services in electronic commerce promise to offer a wide range of new business opportunities. Electronic payment systems and e-commerce are intricately linked given that on-line consumers must pay for products and services. If the claims and debits of the various participants—individuals, companies, banks and nonbanks—are not balanced because of payment delay or, even worse default, then the entire business chain is disrupted.) Hence an important aspect of e-commerce is prompt and secure payment, clearing, and settlement of credit or debit claims.

Everyone agrees that the payment and settlement process is a potential bottleneck in the fast-moving electronic commerce environment if we rely on conventional payment methods such as cash, checks, bank drafts, or bills of exchange. Electronic replicas of these conventional instruments are not well suited for the speed required in e-commerce purchase processing. For instance, payments of small denominations (micropayments) must be made and accepted by vendors in real time for snippets of information. Conventional instruments are too slow for micro payments and the high transaction costs involved in processing them add greatly to the overhead. Therefore new methods of payment are needed to meet the emerging demands of e-commerce. These neo-payment instrument must be secure, have a low processing cost, and be accepted widely as global currency tender.

Types of electronic payment systems Electronic payment systems are proliferating in banking, retail, health care, on-line markets, and even government—in fact, anywhere money needs to change hands. Organisations are motivated by the need to deliver products and services more cost effectively and to provide a higher quality of service to customers. EFT is defined as “any transfer of funds 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.” EFT utilizes computer and telecommunication components both to supply and to transfer money or financial assets. Transfer is information-based and intangible. Thus EFT stands in marked contrast to conventional money and payment modes that rely on physical delivery of cash or checks (or other paper orders to pay) by truck, train, or airplane.

Work on EFT can be segmented into three broad categories:

1. Banking and financial payments (a) Large-scale or wholesale payments (e.g., bank-to-bank transfer) (b) Small-scale or retail payments (e.g., automated teller machines and cash dispensers) (c) Home banking (e.g., bill payment)
2. Retailing payments - (a) Credit cards (e.g., VISA or MasterCard) (b) Private label credit/debit cards (c) Charge Cards (e.g., American Express)
3. On-line electronic commerce payments (a) Token-based payment systems, b) Electronic cash (e.g., Digicash) Electronic checks (e.g., Netcheque) c) Smart cards or debit cards (b) Credit card-based payment systems.c) Encrypted credit cards (e.g. Worldwide Web form-based encryption). d)Third party authorization numbers (e.g. First Virtual)

Designing Electronic Payment System

Despite cost and efficiency gains, many hurdles remain to the spread of electronic Payment systems. These include several factors, many nontechnical in nature, that must be addressed before any new payment method can be successful.

1. **Privacy.** A user expects to trust in a secure system; just as the telephone is a safe and private medium free of wiretaps and hackers, electronic communication must merit equal trust.
2. **Security.** A secure system verifies the identity of two party transactions through “user authentication” and reserves flexibility to restrict information/services through access control.
3. **Intuitive Interfaces.** The payment interface must be as easy to use as a telephone. Generally speaking, users value convenience more than anything.
4. **Database Integration.** With home banking, for example, a customer wants to play with all his accounts. To date, separate accounts have been stored on separate databases. The challenge before banks is to tie these databases together and to allow customers access to any of them while keeping the data up-to-date and error free.
5. **Brokers.** A “network banker” —someone to broker goods and services, settle conflicts, and facilitate financial transactions electronically —must be in place.
6. **Pricing.** One fundamental issue is how to price payment system services. For example should subsidies be used to encourage users to shift from one form of payment to another, from cash to bank payments from paper-based to e-cash. The problem with subsidies is the potential waste of resources, as money may be invested in systems that will not be used. Thus investment in systems not only might not be recovered but substantial ongoing operational subsidies will also be necessary. On the other hand, it must be recognized that without subsidies, it is difficult to price all services affordably.

7. **Standards.** Without standards, the welding of different payment users into different networks and different systems is impossible. Standards enable interoperability, giving users the ability to buy and receive information, regardless of which bank is managing their money.

None of these hurdles are insurmountable. Most will be solved within the next few years. These technical problems, experts hope, will be solved as technology is improved and experience is gained. The biggest question concerns how customers will take to a paperless and (if not cashless) less—cash world.

SMART CARD

A smart card is a piece of plastic, the same size as a credit or debit card, with a silicon chip embedded in it. The chip contains a microprocessor, a miniature computer which can perform calculations and store data in its memory. The card is “smart” because it is “active”, that is it can receive information, process it and then “make a decision”. For example, when a smart card is inserted in a terminal, the terminal sends its “digital signature” to the microprocessor. If the “digital signature” agrees with the existing parameters in the microprocessor’s memory, then the memory files are opened and the data made visible to the terminal. In the same way, the card sends its “digital signature” to the terminal and the terminal’s microprocessor verifies it. This mutual verification is done “off-line” this means that the terminal is not connected to the system’s central computer, known as the “host”. The verification process typically takes a fraction of a second. In addition to digital signatures, Personal Identification Numbers (PINs) and hand-written signatures can be used.

Why are Smart Cards better Than Other Cards

- 1. More Secure.** Data stored on a smart card is protected by sophisticated security mechanisms. It is thus very difficult and expensive to fraudulently alter the data or to copy the cards. Changing from magnetic stripe (magstripe) cards to smart cards can dramatically reduce card fraud linked to counterfeit cards, as well as fraud linked to off-line transactions by making them secure.
- 2. Lower Running Costs.** Merchants do not have to pay telephone costs for secure off-line transactions, thus making it economic for them to accept electronic payment for smaller-value transactions.
- 3. Faster.** Smart cards can perform secure off-line transactions which typically take a fraction of a second, compared with several seconds for on line transactions. For applications such as the electronic purse, this time saving is perceived by cardholder as a

major advantage over other cards and cash. Some card issuers have developed smart cards using contactless technology (this uses a radio transmitter/receiver to make the link between card and terminal, so the cards just have to be waved near a terminal, rather than being inserted into it). This results in even faster transactions, leading to cost savings and improved efficiency in sectors such as mass transit.

4. **Greater Data Capacity.** Smart cards can store more data than magstripe cards. The development of multiple-application technologies, such as Proton, means that many different applications can co-reside on one card , credit/debit; e-purse; travel tickets; loyalty points and security identification, to name but a few.
5. **Flexible.** Smart card issuers exist in many different sectors and use many different applications: The Proton smart card technology is compatible with all major-types of smart card operating system software. It also support Java Card (R), a programming environment that allows applications to be created, stored or deleted from smart cards, meaning that “made-to measure” smart cards will soon be possible, with cardholder selecting the applications on their cards to suit their personal circumstances and needs. Smart cards have been used to perform transactions not only via ATMs (cash dispensers) and point-of - sale (POS) terminals but also using the Internet, public payphones, pay-TV set-top boxes, mobile phones and smart phones.

Applications of Smart Cards

The first mass-market uses for chip cards were telephone cards and bank cards. Other popular applications are

1. **Electronic Purse.** It is usually issued by banks, these electronic payment cards allow cardholders to avoid the hassle of finding correct changes by loading value from their bank accounts into an electronic purse (“e-purse”) which can then be used to pay for small-value everyday purchases at shops, kiosks, vending machines, transport ticket machines, parking meters, public payphones etc.
2. **Security Access Control.** Smart Cards can be programmed to allow access to buildings or data, depending on status and clearance.
3. **Telephone Calling Card.** Smart Cards can identify callers at payphones and allow deferred call billing to a residential account.
4. **Government Card.** With many governments committed to cutting costs and reducing paper work, smart cards can be used as driving licences, passports and visas.
6. **Secure Internet Payments.** Smart cards offer the secure means of payment over the Internet, which consumers are demanding as the e-commerce boom continues, The

adoption of common standards by issuers will lead to international interoperability of cards, so that payments can be made across national borders.

7. **Customer Loyalty Card.** Smart Cards are successfully in use in various customer loyalty schemes run by airlines, hotels, fast-food restaurants, petrol-stations and large retailers, where they record points and redemptions and provide detailed customer behaviour data to scheme operators, enabling them to target promotions more accurately.

Benefits of Smart Cards

1. For Cardholders. Smart Cards are convenient and offer a range of added-value services, that can be tailored to individual needs and, that can be used on the internet.
2. For Merchants. Smart Cards reduce the risk of fraud, the costs associated with cash handling and telephone costs linked to on-line authorisation, as well as offering opportunities to add applications such as loyalty schemes and giving a futuristic image to their businesses.
2. For Card Issuers. Smart Cards greatly reduce costs associated with fraud, they enable extra added value services to be offered to customers, creating revenue and closer customer relationship, and their off-line transactions free space on networks for other on-line activities.

CREDIT CARD

A Credit Card is a thin plastic card, usually 3-1/8 inches by 2 1/8 inches in size, that contains identification information such as signature or picture, and authorizes the person named on it to charge purchases or services to his account-charges for which he will be billed periodically. Today, the information on the card is read by automated teller machines (ATMs) store readers, and banks and internet computers.

Electronic Cash (e-cash) - Electronic cash (e-cash) is a new concept in on-line payment systems because. It combines computerized convenience with security and privacy that improve on paper cash. Its versatility opens up a host of new markets and applications. E-cash presents some interesting characteristics that should make it an attractive alternative for payment over the Internet.

E-cash focuses on replacing cash as the principal payment vehicle in consumer-oriented electronic payments. Although it may be surprising to some, cash is still the most prevalent consumer payment instrument even after thirty years of continuous developments in electronic payment systems. Cash remains the dominant form of payment for three reasons : (1) lack of trust in the banking system, (2) inefficient clearing and settlement of noncash transactions, and (3) negative real interest rates paid on bank deposits.

The predominance of cash indicates an opportunity for innovative business practice that revamps the purchasing process where consumers are heavy users of cash. To really displace cash, the electronic payment systems need to have some qualities of cash that current credit and debit cards lack. For example, cash is negotiable, meaning it can be given or traded to someone else. Cash is legal tender, meaning the payee is obligated to take it. Cash is a bearer instrument, meaning that possession is prima facie proof, of ownership. Also, cash can be held and used by anyone even those who don't have a bank account, and cash places no risk on the part of the acceptor that the medium of exchange may not be good. Now compare cash to credit and debit cards. First, they can't be given away because, technically, they are identification cards owned by the issuer and restricted to one user. Credit and debit cards are not legal tender, given that merchants have the right to refuse to accept them. Nor are credit and debit cards bearer instruments; their usage requires an account relationship and authorization system. Similarly, checks require either personal knowledge of the payer or a check guarantee system. Hence, to really create a novel electronic payment method, we need to do more than recreate the convenience that is offered by credit and debit cards. We need to develop e-cash that has some of the properties of cash.

Properties of Electronic Cash

Of the many ways that exist for implementing an e-cash system, all must incorporate a few common features. Specifically, e-cash must have the following four properties : monetary value, interoperability, retrievability, and security.

E-cash must have a monetary value ; it must be backed by either cash (currency), bank-authorized credit, or a bank-certified cashier's check. When e-cash created by one bank is accepted by others, reconciliation must occur without any problems. Stated another way, e-cash without proper bank certification carries the risk that when deposited, it might be returned for insufficient funds.

E-cash must be interoperable — that is, exchangeable as payment for other e-cash, paper cash, goods or services, lines of credit, deposits in banking accounts, bank notes or obligations, electronic benefits transfers, and the like. Most e-cash proposals use a single bank [MN93]. In practice, multiple banks are required with an international clearinghouse that handles the exchangeability issues because all customers are not going to be using the same bank or even be in the same country.

E-cash must be storable and retrievable. Remote storage and retrieval (e.g., from a telephone or personal communications device) would allow users to exchange e-cash (e.g., withdraw from and deposit into banking accounts) from home or office or while traveling. The cash

could be stored on a remote computer's memory, in smart cards, or in other easily transported standard or special-purpose devices. Because it might be easy to create counterfeit cash that is stored in a computer, it might be preferable to store cash on a dedicated device that cannot be altered. This device should have a suitable interface to facilitate personal authentication using passwords or other means and a display so that the user can view the card's contents. One example of a device that can store e-cash is the Mondex card—a pocket-sized electronic wallet.

E-cash should not be easy to copy or tamper with while being exchanged ; this includes preventing or detecting duplication and double-spending. Counterfeiting poses a particular problem, since a counterfeiter may, in the Internet environment, be anywhere in the world and consequently be difficult to catch without appropriate international agreements. Detection is essential in order to audit whether prevention is working. Then there is the tricky issue of double spending. For instance, you could use your e-cash simultaneously to buy something in Japan, India, and England. Preventing double-spending from occurring is extremely difficult if multiple banks are involved in the transaction. For this reason, most systems rely on post-fact detection and punishment.

One drawback of e-cash is its inability to be easily divided into smaller amounts. It is often necessary to get small denomination change in business transactions. A number of variations have been developed for dealing with the “change” problem. For the bank to issue users with enough separate electronic “coins” of various denominations would be cumbersome in communication and storage. So would a method that required payees to return extra change. To sidestep such costs, customers are issued in a single number called an “open check” that contains multiple denomination values sufficient for transactions up to a prescribed limit. At payment time, the e-cash software on the client's computer would create a note of the transaction value from the “open check”.