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CMP513

E-Commerce Technologies

E-Commerce Technologies

Unit.1 Introduction to E-Commerce and Internet Technology. (Structure)

Enabling Technologies of the World Wide Web
- Internet Client / Server Applications.
- Networks and Internets.
- Internet Service Provider (ISP).
- Broadband Technologies.
History of E-Commerce
- Early Business Information Exchange Efforts.
- Emergence of the Internet.
- Emergence of World Wide Web.
- The Milestones.
- Advantages of E-Commerce
- Online Extension of BAM Model.
- Transition to E-Commerce in India.
- The Information Technology Act 2000.
Business Models for E-Commerce.
- E-Business Model based on Relationship of Transaction Parties.
- E-Business Model based on Relationship of Transaction Types.

Enabling technologies of World Wide Web:

WWW or simply as "the Web" is able not only to access the entire spectrum of information available on the Internet, but also to present it to the user using a single consistent easy-to-use interface.

The ideas behind the World-Wide Web were formulated at CERN in 1989, leading to a proposal submitted in November 1990 by *Tim Berners-Lee* and *Robert Cailliau* for a "universal hypertext system." In the next four years the growth of World Wide Web was expanded in various areas like science, commerce, research, government, semi-government and now in private business and people's homes also.

This article describes the basic concepts behind the World-Wide Web, traces its development over the past four years with examples of its use both inside and outside of the high energy physics community and goes on to describe some of the extensions under development as part of the World-Wide Web project.

World-Wide Web Concepts

The World-Wide Web is designed around two key concepts: *hypertext documents* and *network based information retrieval*. Hypertext documents are simple documents in which words or phrases act as links to other documents.

Typically hypertext documents are presented to the user with text that can act as a link highlighted in some way, and the user is able to access the linked documents by clicking with a mouse on the highlighted areas.

The World-Wide Web extends the well-established concept of hypertext by making it possible for the destination document to be located on a completely different computer from the source document, either one located anywhere on the network.

This was made possible by exploiting the existing capabilities of the Internet, a world-wide network of interconnected computers developed over the preceding 20 years, to establish a rapid connection to any named computer on the network.

To achieve this, the World-Wide Web uses a *client-server architecture*. A user who wants to access information runs a World-Wide Web client (sometimes referred to as a browser) on their local computer.

The client fetches documents from remote network nodes by connecting to a server on that node and requesting the document to be retrieved. A document typically can be requested and fetched in less than a second, even when it resides on the other side of the world from the requester. (Or at least it could be in the early days of the Web; one of the drawbacks of the enormous success of the Web is that sometimes transactions are not as fast now as they were in the earlier, less heavily trafficked days. One of the challenges of the Web's future is to overcome these scaling problems.)

The client-server model offers advantages to both the information provider and the consumer. The information provider is able to keep control of the documents he maintains by keeping them on his own computer.

Furthermore the documents can be maintained by the information provider in any form, so long as they can be transformed by the server software into the format the client software expects to receive. This model can naturally be extended to allow documents to

be dynamically created in response to request from users, for example, by querying a database and translating the result of the query into a hypertext document.

From the information consumers' perspective, all the documents on the Web are presented in the form of hypertext. The consumer is totally unaware of how the documents are maintained by the information provider and, unless he really wants to know, from where the documents are being accessed

Growth of the Web:

The initial implementation of the Web client at CERN was for the NeXT platform. This earliest browser was able to display documents using multiple fonts and styles and was even able to edit documents, but access was limited to users.

This was followed by development of the CERN "*linemode*" browser, which could run on many platforms but which displayed its output only on character-based terminals. These early browsers were followed by the first browsers designed for *X-Windows Operating system*, *Viola* developed at the *University of California*, *Berkeley*, and*Midas* developed at the *Stanford Linear Accelerator Center*.

Initially the growth of the World-Wide Web was relatively slow. By the end of 1992 there were about 50 hypertext transfer protocol (HTTP) servers. At about the same time, Gopher, a somewhat similar information retrieval tool as WWW but based on menus and

plain text documents rather than hypertext, was expanding rapidly with several hundred servers.

During 1993 this situation changed dramatically, driven in large part by the development of the Mosaic client by a talented and extremely enthusiastic group at the *National Center for Supercomputer Applications* (NCSA) at the University of *Illinois* in *Champaign-Urbana*.

The Mosaic client for World-Wide Web was originally developed for X-Windows under UNIX, with subsequent versions released for both the Macintosh and PC platforms.

The Mosaic client software added a few new key features to the World-Wide Web: The ability to display embedded images within documents, enabling authors to greatly enhance the artistic of their documents; the ability to incorporate links to simple multimedia items such as short movie and sound clips; and the ability to display forms.

Forms greatly enhanced the original search mechanism built into WWW by allowing documents to contain fields that the user could fill in, or select from a list of choices, before clicking on a link to request further information.

The introduction of forms to the WWW opened a new arena of applications in which the World-Wide Web acts not only as a way of viewing static documents, but also as a way of interacting with the information in a simple but flexible manner, enabling the design of web-based graphical interfaces to databases and similar applications.

During 1993 the usage of WWW began to grow exponentially. As new people discovered the Web they often became information providers themselves, and as more information became available new users were attracted to the Web.

In comparison to Gopher (Internet Service) and FTP traffic during the same period (FTP stands for file-transfer protocol, one of the earliest protocols developed for the Internet and still the most widely used for transferring large files). Then after few new protocols for, FTP, e-mail and NNTP (Network News transfer protocol) traffic were developed.

Owing to the distributed management of the Internet and the World-Wide Web, it is very difficult to obtain hard numbers about the size of the Web or the number of users. (The number of users on the Internet, often estimated to be in the tens of millions, is itself a contentious issue, with some estimates claiming this number to be an overestimate by perhaps as much as an order of magnitude.) One illustration of the size of the Web came in early 1994 when a server was set up to provide information and up-to-the minute results from the Winter Olympics being held in *Lillehammer*, *Norway*.

The implementation of the server wasn't started until the day before the Olympics were scheduled to start, but two weeks later the server (they arranged mirror server in the United States) had been accessed 1.3 million times, by users on somewhere between 20,000 and 30,000 different computers in 42 countries.

NCSA now estimates that more than a million copies of the Mosaic software have been taken from their distribution sight, and approximate counts of the number of HTTP servers indicates there are more than 3000 servers currently operating (*Stanford University* alone has over 40 HTTP servers.

As the size of the web has increased, so has the interest in the WWW from outside the academic community. One of the first companies to take an active interest in the World-Wide Web was the publisher *O'Reillyand Associates*.

For over a year they have provided an online service, the *Global Network Navigator*, using the World-Wide Web. This includes regularly published articles about developments in the Internet, the "*Whole Internet Catalog*," an index of information available on the Web, a

travel section, business section and even daily online comics and advertising, all illustrated with professionally designed icons.

The Global Network Navigator is now only one of many examples of commercial publishers making information available on the Web, including a number of print magazines and newspapers which are available partially or in their entirety on the Web.

Another interesting example of commercial use of the World-Wide Web is the *CommerceNet* organization. This organization, based in *northern California* and funded by a consortium of large high technology companies with matching funds of $6 million from the U.S. government's Technology Reinvestment Project, aims to actively encourage the development of commerce on the Internet using WWW as one of its primary enabling technologies.

CommerceNet aims to encourage companies to do business on the Internet by making catalogs available and accepting electronic orders, and also by encouraging electronic collaboration between companies.

One specific way that *CommerceNet* is enhancing WWW is by the proposed introduction of a "secure-HTTP," which would enable encrypted transactions between clients and servers.

This would ensure privacy, but perhaps more interestingly would also enable the use of digital signatures, effectively ensuring that when you fill in an order form on the Internet and submit it, it really goes to the company you believe you are ordering from (and only them), and that they know when they receive the order that it really came from you (and can prove it at a later date if necessary).

This mechanism also begins to address a problem of great interest to commercial publishersthat of billing for information accessed through the Web. *CommerceNet* has ambitious plans to incorporate thousands of member companies in the first year or two, primarily in Northern California, but eventually to expand towards the much broader horizons of the Internet.

What Is A Client/Server?
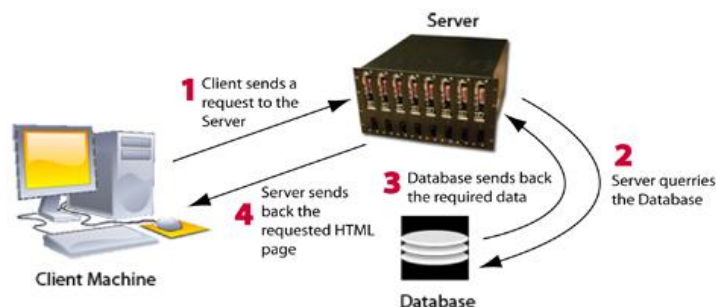
Fig 1.1: Client Server Machines

Client A client is a single-user workstation that provides presentation services, database services and connectivity along with an interface for user interaction to acquire business needs.

Server A server is one or more multi-user processors with a higher capacity of shared memory which provides connectivity and the database services along with interfaces relevant to the business procedures. Client/Server computing provides an environment that enhances

business procedures by appropriately synchronizing the application processing between the client and the server.

Benefits of Client Server Architecture:

Organizations often seek opportunities to maintain service and quality competition to sustain its market position with the help of technology where the client/server model makes an effective impact.

Deployment of client/server computing in an organization will positively increase productivity through the usage of cost-effective user interfaces, enhanced data storage, vast connectivity and reliable application services.

If properly implemented its capable of improving organizational behaviour with the help of the knowledgeable worker-who can manipulate data and respond to the errors appropriately. Following are few of the applications of client server architecture.

- **Improved Data Sharing:**

Data is retained by usual business processes and manipulated on a server is available for designated users (clients) over an authorized access.

The use of *Structured Query Language* (SQL) supports open access from all client aspects and also transparency in network services depict that similar data is being shared among users.

- **Integration of Services:**

Every client is given the opportunity to access corporate information via the desktop interface eliminating the necessity to log into a terminal mode or another processor. Desktop tools like spreadsheet, power point presentations etc. can be used for access of information.

- **Shared Resources Amongst Different Platforms:**

Applications used for client/server model is built regardless of the hardware platform or technical background of the entitled software (Operating System S/W) providing an open computing environment, enforcing users to obtain the services of clients and servers (database, application, communication servers).

- **Inter-Operation of Data:**

All development tools used for client/server applications access the back-end database server through SQL, an industry-standard data definition and access language, helpful for consistent management of corporate data.

Advanced database products enable user/application to gain a merged view of corporate data dispersed over several platforms. Rather than a single target platform this ensures database integrity with the ability to perform updates on multiple locations enforcing quality presentation and recovery.

- **Data Processing Capability:**

Despite the location we are in an era which undergoes a transformation of machine-centered systems to user-centered systems.

Machine-centered systems like mainframe, mini-micro applications had unique access platforms and functionality keys, navigation options, performance and security were all visible.

Through client/server users can directly log into a system despite of the location or technology of the processors. In other words information is stored and processed in centralized manner.

- **Easy Maintenance:**

Since client/server architecture is a distributed model representing dispersed responsibilities among independent computers integrated across a network, it's an advantage in terms of maintenance. It's easy to replace, repair, upgrade and relocate a server while clients remain unaffected. This unawareness of change is called as encapsulation.

- **Security:**

Servers have better control access (Read, Write, Execute/ R-W-X) rights to users and resources to ensure that only authorized clients can access or manipulate data and server-updates are administered effectively. So that security is maintained and not compromised easily.

The Purpose of Client/Server Architecture:

We are in an era where information technology plays a critical role in business applications, considered as an area an organization would highly invest in order to widen the opportunities available to compete the global market. "*A competitive global economy will ensure obsolescence and obscurity to those who cannot or are unwilling to compete*", according to this statement it's necessary for organizations to support its market position by reengineering the superior powerful organizational structures and business practices to achieve their business goals.

In short it's a basic need to evolve with the change of technological aspects. Therefore organizations should undergo a mechanism to retrieve and process its corporate data to make business procedures more efficient to excel or to survive in the global market.

The client/server model brings out a logical perspective of distributed corporative processing where a server handles and processes all client requests. This can be also viewed as a revolutionary milestone to the data processing industry.

Internet / Client Server Applications:

Client-server architecture, architecture of a computer network in which many clients (remote processors) request and receive service from a centralized server (host computer). Client computers provide an interface to allow a computer user to request services of the server and to display the results the server returns. Servers wait for requests to arrive from clients and then respond to them.

In hospital data processing, for example, a client computer can be running an application program for entering patient information while the server computer is running another program that manages the database in which the information is permanently stored.

Many clients can access the server's information simultaneously, and, at the same time, a client computer can perform other tasks, such as sending e-mail.

The users of the Internet interact through one of the several client-server applications. As the name suggest, in a client-server application there are two major classes of software the client software, which usually exists on an end-user's desktop and provides navigations and display.

The other software is the Server Software, which usually exists on a workstation or a server-class machine and provides back-end data access services, where the data can be something simple like a file or complex like a relational database. The most widely used client-server applications are listed below in table.

TABLE 1.1
CLIENT-SERVER APPLICATIONS

APPLICATIONS	PROTOCOL	PURPOSE
World Wide Web	Hypertext Transport Protocol (HTTP)	Offers access to hypertext documents, executable programs, and other Internet resources.
E-mail	Simple Mail Transport Protocol (SMTP) Post Office Protocol Version (POP3) Multipurpose Internet Mail Extension (MIME)	Allows the transmission of text messages and binary attachments across the Internet.
File Transfer	File Transfer Protocol (FTP)	Enables files to be uploaded and downloaded across the Internet.
Chat	Internet Relay Chat Protocol (IRC)	Provides a way for users to talk to one another in real-time over the Internet. The real-time chat groups are called channels.
User Net Newsgroups	Network News Transfer Protocol (NNTP)	Discussions forums where users can asynchronously post messages and read messages posted by others.

Email allows computer users to exchange messages worldwide. Each user of e-mail has a mailbox address or user account identity, with which all main transactions are done. Messages sent via e-mail reach their destination within a matter of seconds.

A powerful aspect of e-mail is the option to send electronic files to a person's e-mail address. Non-ASCII files known as binary files, may be attached to e-mail messages. For example, a document created in *Microsoft Word* can be attached to an e-mail message and retrieved by the recipient in any e-mail program such as pine, *Netscape* messenger or Outlook Express.

Telnet

Telnet is a program that allows you to log into computers on the Internet and use online databases, library catalogs, chat services and more. To Telnet to a computer, you must know its address.

This can consist of words *(www.yahoo.com)* or numbers (204.71.200.67). Some services may require connection to a specific port on a remote computer. In this case, type the port number after the Internet address, for example *telnet dte.vsnl.net.in* to access your Web server.

Probably the most common Web-based resource available through telnet are library catalogues. A link to a telnet resource may look like any other link, but it will launch a telnet session to make the connection. A telnet program must be installed on your local computer and configured to your Web browser in order to work.

File Transfer Protocol (FTP)

This is both a program and method used to transfer files between computers on the Internet. Anonymous FTP is an option that allows users to transfer files from thousands of host computers on the Internet to their personal computer account.

File transfer is quite rapid. FTP sites contain books, articles, software, games, images, sounds, multimedia, course work, data sets, and more. FTP files via search engines such as *FAST FTP* search,Located at *http://ftpsearch.lycos.com/*.This option is convenient because you do not need to know FTP program commands.

Chat on the Web

For the most part, businesses have ignored the potential economic outcome from online communications. Except for e-mail, the Internet and the Web have been treated as a medium with information flowing in only one direction—either pulled by or pushed to the end user.

Most recently, businesses have begun to recognize that the Internet and the Web offer the ability to engage customers in a dialogue and create virtual communities where customers can also communicate with one another.

Chat programs are now common on the web. They are sometimes included as a feature of a website, where users can log into the "*chat room*" to exchange comments and information about the topics addressed on the site. Chat may take other, more wide-ranging forms. For example, *America Online* is well known for sponsoring a number of topical chat rooms.

A variation of chat is the phenomenon of instant messaging. With instant messaging, a user on the web can contact another user currently logged in and type a conversation. The most famous in *America Online's Instant Messenger*.

IRC

IRC is the *Internet Relay* Chat service in which participants around the world can "*talk*" to each other in real-time on hundreds of channels. These channels are usually based on a particular topic.

While many topics are frivolous or carefree, substantive conversations also take place. To have access to IRC, you must use an IRC software program. This program connects you to an IRC server and allows you to visit IRC channels.

The largest nets are *EFnet* (the original IRC net, often having more than 32,000 people at once), Undernet, *IRCnet*, *DALnet*, and *NewNet*.

Generally the user (such as you) runs a program (called a "client") to connect to a server on one of the IRC nets. The server relays information to and from other servers on the same net. Some of the recommended clients are:

UNIX / shell   : ircII
Windows   : mIRC or PRICH
Macintosh   : Ircle

Once connected to an IRC server on an IRC network, you will usually join one or more "channels" and converse with other. On EFnet, often thereare more than 12,000 channels, each devoted to a different topic. Conversations may be public (where everyone in a channel can see what you type) or private (messages between only two people, who may or may not be on the same channel).

Networks and Internet:

The network is two or more connected computer which can share resource like a printer, plotter, a file server, an internet connection, application, etc. It is a collection of computer systems and devices which are linked together using a wireless network or via
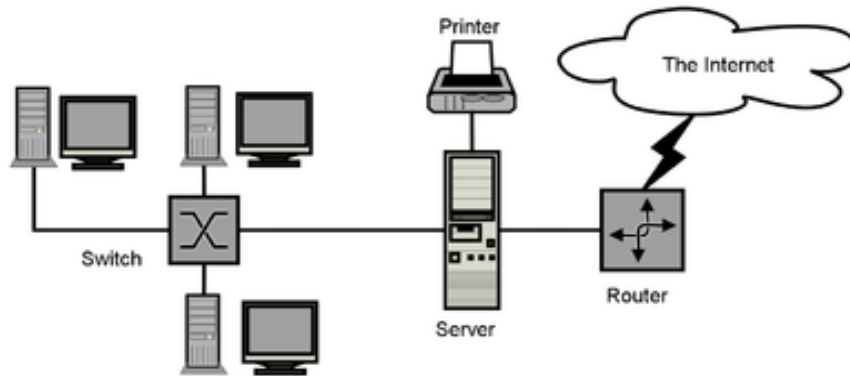
communication devices and transmission media.

Fig 1.2 : Network and Internet

Figure : A Network with a server, a router, and a switch and clines with a shared printer.

The internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the internet. Information that travels over the internet does so via a variety of languages known as protocols.

The internet is a worldwide network of computers that gives customers access to information and documents from distant sources.

Figure 1.3 : Internet connecting static and dynamic (Remote) clients

Internet has the capability to transform society. With the appearance of the internet, distance is not that big an obstacle for commerce. Internet is the most important communication medium to have come along in the last few decades, and businesses have to make wise use of this medium.

The value of internet lies in the connections it enables. *3 types of networks* can be created on the internet. The first type of network is the *one-to-many* or *broadcast network*, in which a supplier provides information to a large number of users.
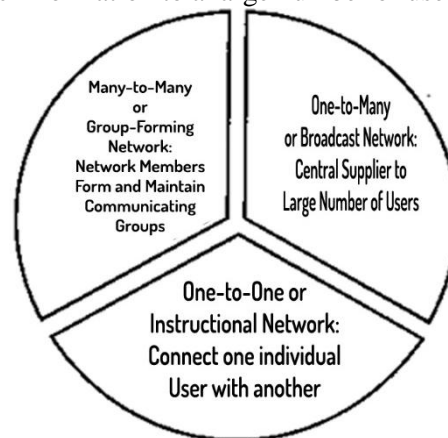
Figure 1.4 : Types of Networks.

For example, a website delivers news to a large number of users. The second type of network is the *one-to-one* or *transactional network*, in which one individual connects with other individuals to exchange information or complete transactions. For example, an individual can send e-mails to his friends.

The third type of network is the *many-to-many* or *group- forming* network, in which members form and maintain communicating groups. Examples of group- forming networks are online communities and business-to-business exchanges.

In a broadcast network, the value of the network increases as the number of users increases, but the value increases only linearly, i.e., every new member adds the same amount of value—it does not matter how large the network has become. Therefore, the value of the network is directly proportional to number of users (n).

In contrast, value grows at a faster pace in a transactional network. The value of each member increases as the network becomes larger because all the members of the network can

connect with the new member—therefore, larger the number of members, more are the number of new connections formed with the new member.

This relationship is governed by *Metcalfe's law* which states that *the value of transactional network grows proportionally to the square of the number of users (n^2)*. In a group-forming network, if all the potential two-person groups, three-person groups and so on are added, the total number of possible groups equals 2^n.

A network-platform business like *America Online* uses all the 3 types of network. When it is delivering news to its visitors, it is using the broadcast network, and hence its value is proportional to the number of visitors to its website (n).

It provides messaging services by using transactional network, and hence its value is proportional to the square of the number of users (n^2). It also allows users to form groups through chat rooms and online communities, and hence its value is proportional to (2^n). All the 3 types of network contribute to the overall value that AOL is able to create. User attention shifts from accessing content to group-forming activities.

Group-forming networks can be very useful in business-to-business relationships. Customers can organize themselves into groups and deal with companies as groups rather than as individuals. Similarly, suppliers can form groups to collaborate among themselves on new technologies and processes. The value that such networks generate increases as the number of members in the network increase.

Communication Switching

Through the use of communication switching, computer networks allow computers to transfer data using shared lines of communication such as a cable. Communication switching works similar to telephone switching networks.

A telephone switching network eliminates the need to connect a wire between your telephone and every telephone you may ever call Instead, the phone company connects your phone (and everyone else's phone) to a set of phones.

Without a telephone switching network, if you needed to call 1000 different people, you would need to connect 1000 lines to your phone. In a similar way, computer networks rely on communication switches. Networks use two common methods of communication switching to transfer *data—circuit switching* and *Packet Switching*. In circuit switching, the switches create a single, ubnroken path between devices that want to communicate.

Most computer networks, includeing the Interent, do not use circuit switching. They use a technique called packet switching. In a typical *terminal-to-host* data connection, the line remains idle for most of the time. Thus, with data connections, a cuicuit-switched approach is inefficient.

In a circuit-switched network, the connection provides for transmission at a constant data rate. Thus, each of the two devices that are connected must transmit and receive at the same data rate as the other. This limits the utility of the network in interconnecting host computers and terminals.

In packet switching, that are transmitted in short packets. A typical upper limit on packet length is 1 kilobyte. If a source has a longer message to send, the message is broken up into a series of packets. Each packet contains a portion (or all for a short message) of the user's data, plus some control information. The control information, at a minimum, includes the information that the network requires in order to be able to route the packet through the network and deliver it to the intended destination.

Web Client   Broken Path   Web Server
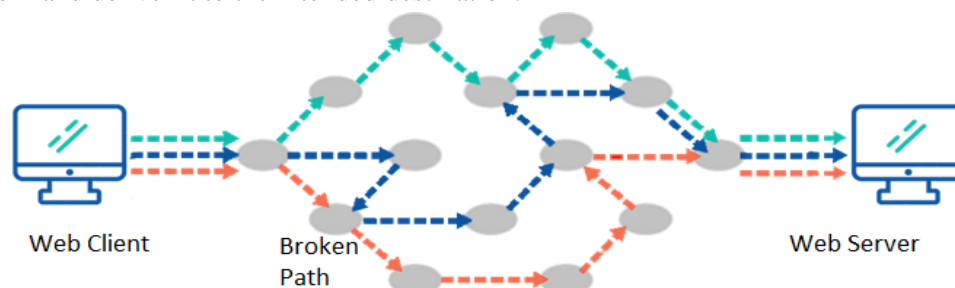
Figure 1.6 : A Packet Switching Network With a Broken Path

At each node on the route, the packet is received, stored briefly, and passed on to the next node. In packet switching, programs break data into small pieces, called packets, and then transmit the packets between computers. Packets are pieces of data that stay attached to a standard set of rules (protocols) that define their size and format. Unlike circuit switching, in a packet-switched network, data can frlow along multiple paths, as shown in figure.

In packet-switched networks, breaking one path does not prevent the data from reaching its destination. The Packet will simply find a different path. Each packet must contain its destination address. As the packet travels from one computer to another, each computer examines the packet's address and routes the packet to its next intermediate hop or directly to the destination. The internet is a packet-switched network.

Think of a packet in a packet-switched newotk as a traveller flying from New Delhi to Mumbai. Depending on the available flights, the traveller may be able to fly non-stop (if the packet is lucky enough to get a direct connection). In most cases, however, the traveller must stop at airports along the way (possibly in Ahmedabad or Jaipur).

In a similar way, a packet may visit several computers as it travesl across the Internet. As signals travel through network media (cables and wires), they become weak. Engineers refer to this weakening of signals as attenuation. To overcome this, the network designers use special networking devices called *repeaters* which amplify network data.

Developments in Transmission

Today, the Internet is measured by the capacity of its cables ot carry information bits to users; this carrying capacity is called bandwidth. Universities and corporations typically connect directly to the Internet with dedicated leased lines of either 1,5,44,0000 or 45,000,000 bits per second (bps).

Each of these lines must support hundreds or even thousands of simultaneous users. In contrast, most home users dial into Internet through the telephone network, at *narrowband* rates. The modems on their computers are connected to a "twisted pair" of copper phone wires that can transmit at the rate of 14,000 to 56,000 bps. At such speeds, the text scrolls quickly down the screen, but a large image can take several minutes to appear.

The Internet can also be accessed at mdband speeds of 128,000 bps or more. At midbank speeds, still images open on the screen quickly, and it becomes possible to transmit moving pictures too, though still fuzzier or not clear and foolish.

Two of the midband technologies—*Asymmetrical Digital Subscriber Line* (ADSL) and *Integrated Services Digital Network* (ISDN)—use wires to connect users to the Internet through a telephone system. Another competing technology beings the Internet to home PCc, using coaxial cables of cable television.

Network Routers

Network designers use routers to transrfer or route data between networks that use different network technologies. Since the Internet is comprised of various networks that use many different network technologies, routers are an integral part of the Internet.

A router has an address on the network. Using the addressing capabilitiy of routers, the nodes on a network can send packets destined for another network to a router. The router, in turn, will transfer the packet to the other network. To manage network traffic, network designers also use routers to segment large sections of a *Local Area Network* (LAN) to smaller segments, called *subnets*.

Using a routing table, routers can *look-up* the correct path (or the best route) from the packet's current location to any destination on the network. Depending on the network's requirements, a designer can implement routing tables as static or dynamic.

Connectionless versus Connection-oriented Protocols

Connectionless protocol differ from connection-oriented protocols in the way requests and responses to requests are handled. With a connectionless protocol, clients connects to the server, make a request, get a response, and then disconnect.

With a connection-oriented protocol, clinents connects to the server, make a request, get a response, and then maintain the connection to service future requests. Example of Connection-Oriented Protocol is FTP, when you connect to an FTP server, the connection remains open after you download a file. In contrast, HTTP is a connectionless protocol. When client connect to the servers are only limited to active conntctions and can generally do thousands of transactions with low system overhead.

Internet Service Provider (ISP):

The US Government's 1991 decided to contribute in the *NSFNET* Backbone beginning in 1995, *sparked* a massive restructing aimed at shaping the internet into a faster and more productive tool for the business. The *InterNIC* corporation of public access dial-up providers listed 80 vendors in December 1993. A year later, the list cited more than 1500 providers. Following figure illustrates how the providers work.

Figure 1.6 : Working of ISP's
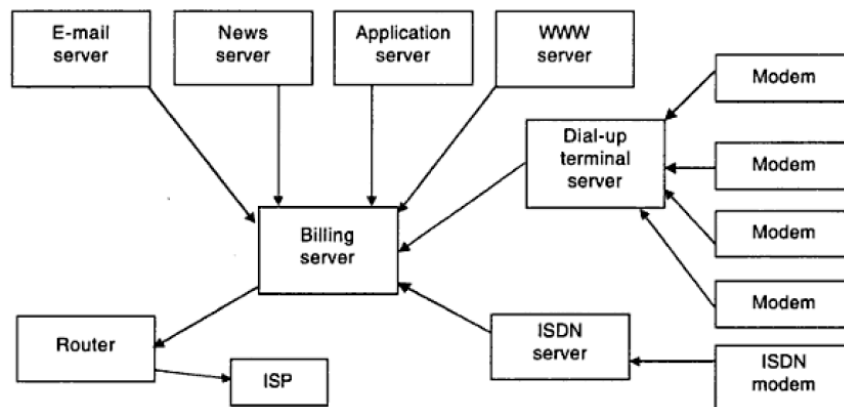
Commercialization of the internet has taken place in two spheres: *commercialization of users* and *commercialization of ISPs*. At first companies that accessed the Internt through the existing non-profit mid-level networks were offered a lower level of membership than the academic members.

As restrictions were break up, commercial use of the Internet became more common, as soon as the commercialization was announed, ISPs came into companies and individuals. Established telecommunications, cable and commercial online companies began to offer this service. Soon, others followed.

From a physical standpoint, the internet is a network of thousands of interconnected networks. Included among the interconnected networks are:
1. The interconnected backbones that have international reach.
2. A multitude of access / delivery sub-networks.

3. Thousands of private and institutional networks connecting various organizational servers and containing much of the information of interest. The backbones are run by Networks service providers (NSPs). The delivery subnetworks are provided by the local and regional ISPs. The ISPs exchange data with the NSPs at the Network Access Points (NAPs).
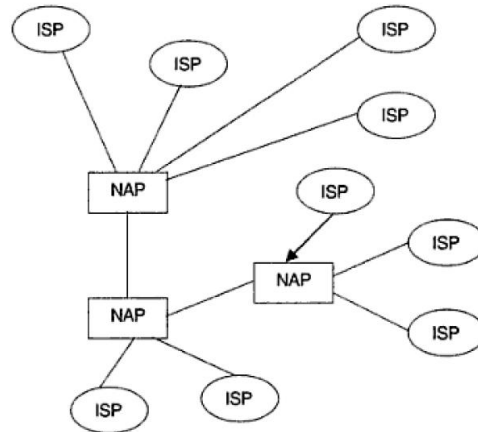
Figure 1.8: ISP's and NAP's

When a user issues a request on the internetFrom a computer, the request traverses or visits an ISP network, moves over one or more of the backbones and across another ISP network, to the Computer containing the information of interest.

The response to the request follows a similar path. For any given reuest and associated response, there is no preset (Predecided) rout, in fact, the request and response are each broken into packets, and the packets can follow different paths. the paths traversed by the packets are determined by special computers called *routers*.

ISPs in india :

Internet access, in a sense, came into India in the early 1990s. ERNet, a division of *Department of Electronics* (DoE), and NICNet (*Department of Statistics*) made the intial role in this field. Both ERNet and NICNet are government projects, but with very different charaters and growth histories.

The ERNet (*Educational and Research Network*) project was designed to provide Internet Connectivity to the premier educational and research institutions of India. While NICNet was assigned the provision of Internet Services Primarily to government departments and organizations.

NICNet was designed to provide V-SAT and dial-Up Internet access primarily to government departments. It began with shell-only access, at 2400 bps, but now provides high speed TCP/IP access through 64kbps V-SAT Links.

ERNet and NICNet are thus India's first ISPs, though their operations have been shakled by the restrictions imposed on them by the government in the form of regulations and policies of the *DoT*. Despite this, they were doing quite well in providing essential Internet services to an Internt-Started India, until the advent of VSNL Internet services and the restrictive clampdown / crackdown that followed.

Another provider of Internet serice that preceeded *Videsh Sanchar Nigam Limited* (VSNL) is the *Software only Technology Parks of India* (STPI) internet service. Again, this service was permitted only to a restricted audience, essentially the software exporters who fall under the STP scheme of the DoE, STPI has been providing high-end internet services through leased lines and dial-up links, in and around several parts of the country, through the respective softNET networks.

On August 15, 1995, VSNL launched the *Gateway Internet Access Service*, for providing public internet access. Starting with only dial-up shell and PPP access in the 4 metros, VSNL followed with leased-lin access to subscribers, followed by the setting up of *Points of Presence* (POP) in Bangalore and Pune, VSNL has, since the inception of GIAS, portrayed / Drawing itself in the press as India's only legitimate ISP, while forcing many restrictions on the other ISPs through DoT regulations and the telecom policy.

There is no bar on the number of companies which will be given licences and licence free is virtually non-existent –none for the first five years and apply minor rates Rs 10 for the next 10 years. The equity for foreign investment has been kept at 49 percent as is the norm with other telecom services opened to the private sector.

The interested companies are free to fix their tariff and there is no insistence on coverage. E-mail companies have been decided to automatically become *Internet Service Providers* (ISPs). However, pending a more defined policy, 'conditional licences' will be given to companies which have defaulted on licence fees in other services such as cellular, radio paging and basic phone services.

The present policy is not very different from the previous one prepared by a committee headed by *Dr.Bimal Jalan* and announced by a previsous government. The policy based on Dr.Jalan Committee recommendations was announced on January 15, 1998.

The categories of ISPs have been specified. In the category A, licences are given on an all-india basis, under the second category fall the 20 territorial (rural) circles (3-12 mile limited area) and the four metro telephone systems of Delhi, Mumbai, Chennai, and Calcutta as well as Bangalore, Hyderabad Ahemadabad and Pune, Any secondary switching area (equivalent to a district) from a separte category C service area with the exception of the eight cities defined in B category. The security deposit has been fixed at Rs 2 crores, Rs 20 lakhs and Rs 3 lakhs (Note: 1 lakh = 1000000,000, 1 crore = 100 lakhs) respecitively.

Private companies have been allowed to establishe their own gateways in addition to using the gateways of DoT, VSNL or authoriesed public/government organisations. But this concept is only in principle because the Government has set up an inter-ministerial or ministry committee which will first go into security-related issues before granting permission to ISPs to set up alternate internation gateways. Till then subscribers to ISPs will have to grapple or make fast with the problem of congestion facing existing Internet Subscribers unless the VSNL dramatically increases the number of access nodes.

In addition to leasing transmission links from the DoT, ISPs are also allowed to utilise the infrastructure planned to be set up by the *Railways, State Electricity Boards, Power Grid Corporation* etc. A point of disagreement might arise over the lease charges with the DoT likely to insist that these organisations should charge the same amount as DoT. The railways is planning two optical fiber-based networks between Chennai and Mumbai and Delhi and Mumbai with branches at a number of places.

There are in all 183 operating Insternet Service Providers in India. Of them 41* ISPs are listed below.

ISPs Having All-India Licence Indclude

BSNL	CMC	RPG Infortech	Essel Shyam Communications
SIFY Services	Siti Cable Network	Gateway System (India)	World Phone Internet
VSNL	Guj Info Petro	Hughes Escorts Communications.	Astro India Networks
Reliance	Primus Telecommu-	ERNET India	RailTel Corporation

	nications India		
Data Infosys	GTL	Jumpp India	L&T Finance
HCL Infinet	Primenet Global	Tata Internet Services	Tata Power Broadband
Bharti Infotel	Pacific Internet India	In2Cable (India)	Reliance
Engineering Associates			
BG Broad India	Swiftmail Communications	Estel Communication	Bharti Aquanet
Trak Online Net India	Spectra Net	Reach Network India	i2i Enterprise
Tata Tele-Services Services. (Maharashtra)Fertilizers Corporation	Comsat Max	Gujrat Narmada Vally	HCL Comnet Systems and

Terms Related to ISPs

There are some terms exclusive for ISPs.

Shell Access

Internet acess supporting only textual interfaces, with Unix or Unix-line operating system commands. This requires "logging in" to a Unix-type user account, and then operating via textual commands or text-based menu systems. Shel access does not use the TCP/IP network protocols between the user (client) end and the servers. Therefore, applications like Netscape, NFS file sharing, and Internet Telephony cannot be used.

Dial-up Modem

As opposed to leased-line modems, this device is connected between a computer or a *Data Terminal Equipment* (DTE) and a conventional POTS analog telephone line. This is used to dial in to a corresponding modem at the service provider, and connect to the Internet or other services (e.g. INET X.25 network).

Serial Line Internet Protocol (SLIP)

SLIP is one of the popular protocols for IP access over dial-up and analog leased lines, Now commonly authorized by Point-to-Point Protocol (PPP), it is still used by some ISPs. SLIP and PPP are two similar methods of encapsulating TCP packets to go over a modem line. PPP is simpler to set up, as compared to SLIP, and can handle more types of traffic, these two enable the PCs to become part of the Internt.

Very Small Aperture (Opening) Terminal (V-SAT)

V-SAT is a satellite-base digital communication system usually consisting of 1.8 meter diameter satellite dishes establishing point-to-point connections, often via a V-SAT Hub, a central switching system. Bandwidths can be from 2400 bps to 256 kbps. Communcation delay is high, due to the two satellite moves between end points, and hub latency or discontinuation.

ISP Policy of the Government of India

Given the rapid growth of Internet across the world and in india (about 0.25 million accounts), the government came out with an Internet plicy to promote the same. The key features are:

- Any company incorporated in India is eligible to set up an ISP.
- The foreign equity holding should be limited to 49 percent.
- Licence period would be for 15 years.
- There is no licence fee for the first five years and Rs 1 Per anum for subsequent years.
- There will be different licences for different areas. For this purpose, the entire country has been divided into three categories.

Category 'A'—the whole india.

Category 'B'—companies 20 telecom circles in cities like Delhi, Mumbai, Kolkata, Chennai, Ahmedabad,

Bangalore, Hyderabad, and Pune.

Category 'C—covers the secondary-switching areas of DoT.

- A company can get any nuumber of licences.
- There shall be no limit on number of licences that can be granted a company in a particular area.
- International connectivity would be through gateways of DoT, VSNL or authorized public/government organizations.

Broadband Technologies

Broadband refers to the transmission medium or the physical connection with which users can access the internet . at speeds faster than the ones currently prevalent. Broadband access can be through any medium—copper, fiber or wiress.

In early 1999, the *US Federal Communications Commission* (FCC)—which regulates, telecommunications and broadcasting in the USA—issued a definition of broadband, which is widely accpeted.

The FCC has defined broadband as the *capabilitiy of supporting, in both the providers to consumer (downstream) and the consumer to provider (upstream), a speed (or in technical terms, bandwidth) in excess of 200 kbps in the last mile.*

More bandwidth is needed to download a photograph in one second than one page of text in one second. Computer programs and animated video require even more bandwidth if they are to be downloaded in the same period of time it takes to download a text.

The explosion in the demand for broadband can be due to various reasons. Mediums capable of supporting broadband, such as fiber optic, have been around since the 1950s. and for the first time, telecom companies began to pay attention for providing broadband services in the so-called last mile—the final link between the end user and the provider of the service.

Types of Broadband Networks.

Digital subscriber Line (DSL)

Faced with the limitations of their cable infrastructure, the telecommunications industry needed a technology that could deliver high-bandwidth Internet access over existing phone wiring. *Integrated Services Digital Network* (ISDN) was offered in the mid 1990s with moderate success.

However, the telephone companies soon found their switched voice networks saturated with data traffic. DSL has gained wide success. Tit is comprised of two basic parts: a head-end device, called a *Digital Subscriber Line Access Multiplexer*, and a DSL modem / router, which is found at the subscriber location.

The human ear can detect sonic waves upto the frequency of about 20 kHz. DSL essentially modulates binary data into sonic frequencies above 20 kHz. Thus data can "ride" the phone lines alongside an active voice transmission, undetected by the caller.

Cable Modems

Faced with competition as well as an increading number of customers who are switching to digital satellite service, cable *Multiple Service Operators* (MSOs) needed to quickly adopt value added services to capture and retain their customer base. One of these services is high speed Internet Access via a cable modem.

Cable modem technology utilizes the *Hybrid Fibre Coax* (HDC) or the all-coaxial infrastructure of the local cable provider. Cable modems and cable head-end devices usually adhere to the *Data Over Cable Service Interface System* (DOCSIS) initiative, This system consists of a head-end device located at the MSO and a cable modem located on the customer's premises. The cable modem provides an Ethernet port for connectivity to the customer's PC or network.

Bandwidth capabilities have undergone several evolutions, from 500 kbps to 4 mbps, then to 10 mpbs, and finally to 30 mbps. Manufacturers are now promising even further bandwidth increases. However, while bandwidth on this scale may be adequate for today's applications, it will suffer serious scalability issues in the future.

Passive Optical Networks (PON)

Passive Optical Networks are access networks in which fiber trunks are fed towards end points and split into multipoint trees along the way, until reaching a termination of the fibre run. A PON consists of *Optical Line Termination* (OLT) and *Optical Network Unit* (ONU) equipment.

It is deemed "passive" because the physical connection between the OLT and ONUs, referred to as the *Optical Distribution Netwrok* (ODN), consists only of passive components such as optical fibres, connectors, splitters, combiners, and splice points. One OLT typically supports up to 32 ONUs; the ITU recommendation states a desired support for up to 64 ONUs.

Wireless LAN and LMDS

Local Multipoint Distribution Service (LMDS) and IEEE 802.11 represent a growing popularity of non-terrestrial network systems. While they both employ the use of radio frequencies, they are vastly different in both intent and deployment.

Early in 1998, the FCC held an auction of the wireless spectrums in the rang of 28-31 GHz, which were to be utilized for LMDS implementations. This accomplishded two things generating over a half-billion dollars of revenue for the FCC, and opening up real competition in the local loop. While LMDS is not specifically being deployed for local broadband services to date, it is conceivable that it will be in the near future.

The major applications being considered for the future of LMDS are wireless consumer video and wireless Internet access. some providers are placing fixed antennae throughout bandwidth of these systems is comparable to the sub 300 kbps DSL service that ILECs are providing. However, the frequency band utilized is so large that the bandwidth could be scaled much higher.

Asynchronous Transfer Mode (ATM)

ATM emerged in the early to mid-1990s as a telecommunication grown technology that was being pushed to the enterprise LAN. Simply explained, ATM is a Layer 2 technology that establish connection-oriented *Virtual Circuits* (VC) across the network VCs can either be manualy configured, using *permanent virtual circuits* (PVCs), or set up and tear down dynamically as needed, using *Switched Virtual Circuits* (SVCs).

Once a connection is established, data packets are segmented into 53-byte cells. These cells are transmitted across the VC to egress ATM switch, reassembled into the original packet, and delivered to the intended destination. This process is called as segmentation and reassembly. ATM is a very successful telecommunication carrier space, because it has the end-end *Quality of Service* (QOS) throughout the network.

10/100/1000 Mbps Ethernet

Ethernet has enjoyed phenomenal success in enterprise LANs since its inception in the early 1980s. today, well over 90 percent of deployed networks are based on this solid and standarized technology. It has grown from a shared 10 mbps technology, where all users on the network contend for the same pool of bandwidth, into a switched technology providing dedicated bandwidth to each subscriber at up to a full gigabyte of throughput. Thosands of Ethernet devices are available to handle everything from small, home-based networks, to wiring closets and even 500 backbones. World-Wide shipments of Ethernet devices measure in tens of millions of interfaces.

The IEEE 802.3 committee, which is responsible for the ethernet standard, is broken into sub-committees based on different versions of Ethernet. The following are the specific committees:

IEEE 802.3—Ethernet (10 Mbps)
IEEE 802.3u—Fast Ethernet (100 Mbps)
IEEE 802.3z—Gigabyte Ethernet (1000 Mbps)
IEEE 802.3ae—10 Gbps Ethernet (10 Gbps): standard under development.

E-business Models Based on the Relationship of Transaction Parties

Electronic markets are emerging in various fields. Different industries have markets with different characteristics. For example, an information B2C market differs in many respects from the automotive B2B market. The former represents companies that sell digital information goods, such as news, articles, music, books, or digital videos.

In the information B2C market, the electronic infrastructure not only helps match customers and sellers, but also acts as the distribution channel, delivering products to customers. In this case, the infrastructure, such as servers and networks, must support the delivery of large files, streaming or flowing media and other types of digital goods in an efficient way.

This B2C market over the Internet can be viewed as an open system, where the numbner of participants is unknown. In the automotive B2B market, the products traded, such as parts and components of cars, have a high degree of specificity. The market infrastructure used is to be mainly based on *Electronic Data Interchange* (EDI)over expensive VAN services. EDI involves the exchange of standarized, structured information between organizations, permitting direct communication between computer systems.

At the heart of B2B applications is the strong integration of diffeent applications. Servers, networks, and software should provide the infrastucture to integrate Web-based applications with mainframe and legacy systems. B2B is also a closed market in the sense that the number of participants involved in trading is limited and known a priori or independent.

Understanding the nature of the market's requirements critical for creating the underlying e-business infrastructure. The relation between B2B and B2C models is clearly shown below, folliwng figure B2B covers business transactions along the various interactions existing in the value chain from procedures of raw materials to retailers and consumers including manufacturers and distributors.
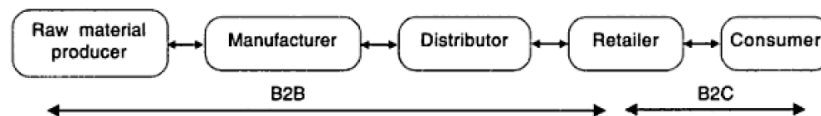
Figure 1.9 : Relation between B2B and B2C models.

In Contrast, B2C reflects only the interactions between a customer and a retailer. Basically, B2C transactios include the following steps; (i) Account Acquisition, (ii) Product discovery through search and browse, (iii) Price negotiation, (iv) Payment, and (v) Product delivery. In some cases, dispute resolution and customer services may also exist.

E-commerce can be classified according to the transaction partners such as business-to-consumer (B2C), Business-to-Business (B2B), Business-to-Government (B2G), Consumer-to-Consumer (C2C), and Consumer-to-Business (C2B). within these broad categories, there are a number of variations in the way the models are implemented. Following table summarizes some of the current e-business models. The contents of this table are illustrated in the folrm of a diagram in figure.

TABLE 1.3
SUMMARY OF E-BUSINESS TRANSACTION MODELS

MODEL	DESCRIPTION	EXAMPLES
B2C	Self products or services direclty to consumers.	*amazon.com,*
B2B	sells products or services to other business or Brings multiple buyers and sellers together In a central marketplace.	*MaterialSite.com, VerticalNet.com, SHOP2gether.com*
B2G	Businesses selling to local, state, and federal agencies.	*iGov.com*
C2C	Consumers sell directly to other consumers.	*ebay.com, InfoRocket.com*
C2B	consumers fix price on their own, which businesses Accept or decline.	*Priceline.com*
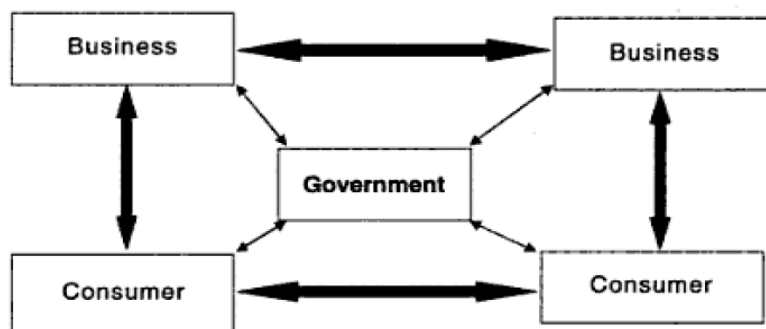
Figure 1.10 : E-Business Transaction Model

Business-to-Consumer (B2C)

Consumers are increadingly going online to shop for and purchase products, arrange financing, arrenge shipment or take delivery of digital products such as software, and get service after the sale. B2C e-business includes retail sales, often called e-retail (e-tail), and other online purchases such as airline tickets, entertainment venue tickets, hotel rooms, and shares of stock.

Many traditional brick-and-mortar retailers such as *Barnes* and *Noble* are now e-tailers with a Web storefront. These combined brick-and-mortar/online businesses are also known as *brick-and-click* companies.

Some B2C e-business provide high-value content to consumers for a subscription fee. Examples of e-business following this subscription model Include the *Wall Street Journal* (financial news and articles), Consumer Reports (Product reviews and evaluations), and eDiets.com (nutritional counselling).

B2C e-business models include virtual malls, which are websites that host many online merchants. Virtual malls typically charge setup, listing, or transaction fee to online merchants, and may include transaction handling services and marketing options. Examples of virtual malls include *excite.com, choicemall, women.com, networkweb.com, amazon.com, Zshops.com,* and *yahoo.com.*

E-trailers that offer traditional or Web-specific products or services only over the Internet are sometimes called *virtual merchants*, and provide another variation on the B2C model. Example of virtual merchants include *amazon.com (books, electronics, toys, and music), eToys.com(children's books and toys)*, and *ashford.com (personal accessories).*

Some businesses supplement a successful traditional mail-order business with an online shopping site, or move completely to web-based ordering. These businesses are sometimes called *catalogue merchants*, Examples *include avon.com (cosmetics and fragrances)*, *chefs (cookware and kitchen accessories), Omaha Steaks (premium steaks, meats, and other gourmet food), and Haary and David (gourmet food gifts).*

Many people were very excited about the use of B2C on the Internet, because this new communication medium allowed businesses and consumers to get connected in entirely new ways. The opportunities and the challenges posed by the B2C e-commerce are enormous. A large amount of investment has gone into this and many sites have either come up or are coming up daily to tap this growing market.

Some of the reasons why one should opt for B2C are:

1. ***Inexpensive costs, big opportunities***. Once on the Internet, opportunities are immense or in large extend as companies can market their products to the whole world without much additional cost.

2. ***Globalization***. Even being in a small company, the Web can make you appear to be a big player which simply menas that the playing field has been levelled by e-business. The Internet is accessed by millions of people around the world, and definitely, they are all potential customers.

3. ***Reduced operational costs***. Selling through the Web means cutting down on paper costs, customer support costs,advertising costs, and order processing costs.

4. ***Customer convenience***. Searchable content, shopping carts, promotions, and interactive and user-friendly interfacesfacilitate customer convenience, thus generating more business. Customers can also see order status, delivery status, and get their receipts online.

5. ***Knowledge management***. Through database systems and information management you can find out who visited your site, and how to create, better value for customers.

How does B2C work?

B2C e-commerce is more than just an online sotore. It really is about managing the entire process, but just using technology as a tool for order processing and customer support. Following figure depicts the processes in B2C. the B2C process is now explained in greater detail.

1. ***Visiting the Virtual mall.*** The customer 'visits' the mall by browsing the online catalogue—a very organized manner of displaying products and their related information such as price, description, and availability. Finding the rights product becomes easy by using a keyword search engine. Virtual malls may includes a basic to an advanced search engine, product rating system, content management, customer support systems, bulletin borads, newletters and other components which make shopping convenient for shoppers.

2. ***Customer registers.*** The customer has to register to become part of the site's shopper registery. This allows the customer to avail of the shop's complete services, the customer becomes a part of the company's growing database and can use the same for knowledge management and data mining.

3. ***Customer buyes products***. Through a shopping card system, order details, shpping charges, taxes, additional charges and price totals are presented in an organized manner. The customer can even change quantitiy of a certail product. Virtual malls have a very comprehensive shopping system, complete with check-outforms.

4. ***Merchant processes the order.***The merchant then processes the order that is received from the previous stage and fills up the necessary forms.

5. ***Credit card is processed.*** The credit card of the customer is authenticated through a payment gateway or a bank. Other payment methods can be used as well, such as debit cards, prepaid cards, or bank-to-bank transfers.

Customer identifies a need
↓
Searches for the product or services to satisfy the need
↓
Selects a vendor and negotiates a price
↓
Receives the product or service (delivery logistics, inspection and acceptance)
↓
Makes payment
↓
Gets service and warranty claims
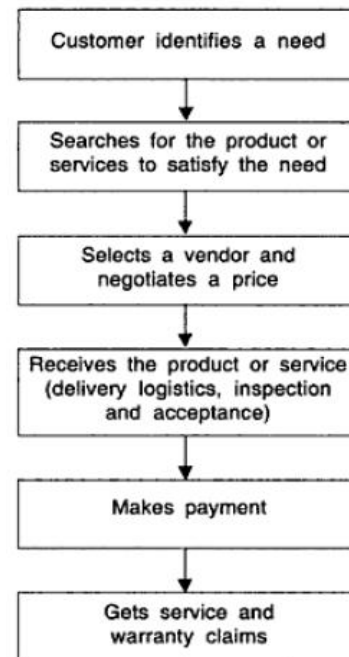
Figure 1.11:   Processes in B2C

6. ***Operations management.*** When the order is passed on to the logistics people, the traditional business operations will still be used. Things like inventory management, total quality management, warehousing, optimization and project management should still beincorporated even though it is an e-business. Getting the product to the customer is still the most imprtant aspect of e-commerce.

7. ***Shipment and delivery.*** The product is then shipped to the customer. The customer can track the order/delivery as virtual malls have a delivery tracking module on the website which allows a customer to check the status of a particular order.

8. ***Customer receives.*** The product is received by the customer, and is verified. The system should then tell the firm that the order has been fullfilled.

9. ***After-sales service.*** After the sale has been made, the firm has to make sure that it maintains a good relationship with its customers. This is done throught customer relationship management or CRM.

Business-to-Business (B2B)

B2B is that model of e-commerce whereby a company conducts its trading and other commercial activity through the Internet and the customer is another business itself. This essentially means commercial activity between companies through the Internet as a medium.

This is supporsed to be a huge opportunity area on the Web. Companies have by and large computerized all the operations worldwide and now they need to go into the next stage by linking their customers and vendors.

This is done by supply chain software, which is an integral part of your ERP application. Companies need to set up a backbone of B2B applications. Which will support the customer requirement s on the web. Many B2B sites are company and industry specific, catering to a community of uses, or a re a combnination of forward and backward integration. Companies have achieved huge savings in distibution-related costs due to their B2B applications.

Major Advantages of B2B

1. ***Direct interacaction with customers***. This is the greatest advanted of e-business. The unkown and faceless customer including other businesses, buying the products of a large MNC like say HLL or Procter and Gamble through distibutors, channels, shops and the lime, now has a name, face, and a profile. Large MNCs pay a fortune for this information on customer buying patterns.

2. ***Focussed sales promotion***. This information gives authentic data about the likes, dislikes and preferences of clients and thus helps the company bring out focusses slaed promotion drives which are aimed at the right audience.

3. ***Building customer loyalty***. It has been observed that online customers can be more loyal than other customers if they are made to feel special and their distinct identity is recognized and their concerns about privacy are respected. It has also been fund that once the customer develop a binding relationship with a site and its product, they do not like shift loyalties or faithfulness to another site or product.

4. ***Scalability***. This means that the web is open and offers round-the-clock access. This provides an access never known before, to the customer. This access is across locations and time zones. Thus a company is able to handle many more customers on a much wider geographical spread if it uses an e-business model.

    The company can set up a generic parent site for all locations and make regional domains to suit such requirements. Microsoft is using this model very successfully. The additional cost of serving a large segment of customers comes down drastically once a critical mass is reached.

5. ***Savings in distribution costs***. A company can make huge savings in distribution, logistical and after-sales support costs by using e-business models. Typical examples are of computer companies, *airlines*, and *telecom companies*. This is because the e-business models involve the customer in the business incteraction to such a level that companies are able to avoid setting up the huge backbone of sales and support force, which ordinarily would have to be set up.

Tools and techniques at the Disposal of B2B Enterprises

It is important to know the right marketing strategies, which would be required to sell successfully and profitably over the Web. The Web as a medium provides you with a unique platform to enable various strategies, which would not have been possible to execute in a conventional scenario. Some of these are;

1. ***Use of pricing as a tool***, there is a wealth of research on pricing used as a tool to generate sales on the Internet. The biggest e-tailer of them all, *amazon.com*, made it big by giving substantial discounts. Part of these heavy discounts is attributed to the distributor level commiissions, which are now being passed on to the customer. Aprt from this, companies

have started giving things free on the Internet in order to get a critical mass of subscribers, which helps in getting advertising revenues. The best example is the *Apple IMac* computer machine being given free if the buyer agrees to make a certain amount of purchase using the *Apple's* e-commerce website.

2. ***Use of application service provider model***, this is an old model of the 1970s, which was used among mainframes, and dumb terminals, and which is being revisited with a re attempt. Software companies are offering their packages not in CDs and boxes but through the Web. The customer can log in over the Internet and access the software from the web server of the company and need not download it into his PC. This goes one step further in the age of the networked PCs where one need not use even a hard disk and all critical application data is kept on the Web and can be accessed from anywhere in the world. These service (which are not products) are being offered at, say $5 an hour.

3. ***Use of generic models which are known for efficiency as well as personalized attention to various business customers***. The Web has given rise to a new partnership between brick-and-mortar manufacturer, e-trailers, and express delivery companies like *FedEx*. These organizations take care of the individual elements of the customer, the order fulfillment and the post sale complaints, if any.

4. ***Use of compariosn shopping***. The Internet has brought in a whole new concept of price matching and comparison-shopping. Today there are sites, which will take you to hundreds of sites to fine the cheapest product to suit your specifications. This would never have been possible without the Internet.

Business activities between companies can be transacted over an extranet. An extranet consists of two or more intranets connected via the Internet, where participating companies can view each other's data and complete business transactions such as purchasing.
Like B2C models, B2B models take a variety of forms. There are basic B2B Internet storefronts, such as Staples and office depot, that provide business customers wih purchase, order fulfillment, and other value added services.

Another B2B model is a business trading cummunity also called a *vertical Web community*, that acts as a central source of information for a vertical market. A vertical market is a specific industry in which similar products or services are developed and sold using similar methods.

Examples of broad vertical markets include insurance, real estate, banking, heavy manufacturing, and transportation. The information available at a vertical Web community can include buyer's guides, supplier and product directories, industry news and articles, schedules for industry trade shows and events, and classified advertisements. *MediaSpeciality.com* (healthcare), *HotelResource* (hospitality), and *NetPossibilities* (building trades) are examples of virtual vertical marketspaces. B2Bexchanges are websites that bring multiple buyers and seller can buy from and sell to each other at dynamic prices determined buy the exchange rules.

Following table illustrates some common elements of B2B exchanges. B2B exchanges can be further categorized into severl ways as aggregators, trading hubs, post and browse markets, auction markets, and fully automated exchanges.

TABLE 1.4
COMMON ELEMENTS OF B2B EXCHANGES

Elements	Benefits
Centralized markspace either sellers or buyers.	Neutral and nonaligned with
Standarized documentation regulated.	Users are prequalified and
Price quotes, price history, and after-the-sale Information providedregulating.	Pricing mechanism is self-
Confidential transactions between businesses. provided.	Clearing and settlement services

B2B aggregators provide a single marketspace for company purchasing by providing many like-formatted supplier product catalogues in one place. Examples of B2B aggregators include *e-chemicals* (industrial chemicals), *chemdex* (chemicals), *MetalSite* (steel and other metlas), and *freightquote.com* (shipping services).

 Trading hubs are B2B sites that provide a marketspace for multiple vertical markets. Horizontal trading hubs support buyers and sellers from many different industries. *verticalNet* is an example of a horizontal trading hub.

 A poineer in providing virtual vertical market-spaces, it maintains business trading communities for many different industries, including comminications, energy, healthcare, food service, and manufactureing. Diagonal trading hubssupport specific types of buyers or sellers, or specific types of products across multiple industries. *SHOP2gether.com* is an example of a diagonal tradin g hub.

 Post and browse markets such as *CATEX* (insurance, reinsurance, and risk management), *CreditTrade* (credit derivatives), and *TechEx* (life sciences intellectural property)enable participants to post buy or sell opportunities on an electronic bulletien board. Instreseted parties meet through the postings and negotiate transactions for thermselves.

 B2B auction markets enable multiple buyers or sellers to enter competitive bids on a contract, Examples of B2B auction markets include *e-STEEL* (steel and other metals), *HoustonStrect.com* (energy), *Altra* (energy), and *Macheim Online* (auto dealer auctions). Auction markets may include reverse auctions or "name your price" auctions.

 In a reverse auction, a product's selling price continues to decline until the product is purchased. "Name your Price" auctions, which allow buyers to enter a bid for a product or service that a seller can then provide at the bid price, are also called reverse auctions. *FreeMarkets* is an exmaple of a B2B site conducting reverse auctions.

Business-to-Business transactions and Models

 B2B interactions involve mush more compexity than B2C. for instance, typical B2B transactions include, among others, the following steps: (i) Review catalogues, (ii) Identify specifications, (iii) Define requirements, (iv) Post request for proposals (REP), (v) Review vendor reputation, (vi) Select vendor, (vii) Fill out purchase orders (PO), (viii) Send PO to vendor, (ix) Prepare invoice, (x) Make payment, (xi) Arrange shipment, and (xii) Organize product inspection and reception. Due to the large number of transacitons involved, business-to-business operations can be too risky if e-business sites cannot guarantee adequate quality of service in terms of performance, availability, and security.

Several models and classifications have been proposed for B2B commerce. Following figure illustrates an electronic marketplace for B2B trading. The model could be oriented to a vertical market (e.g. wholesale trade, chemicals, construction, and electronics) or to a horizontal approach (e.g. office supply and logistics).

Electronic Marketplace
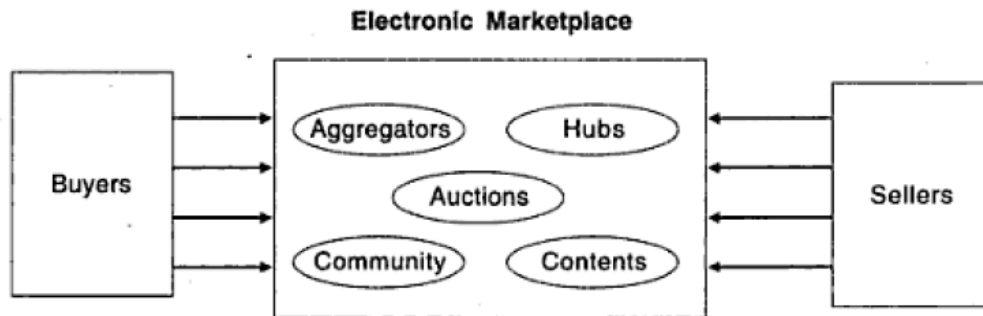
Figure 1.12 : Business-Business (B2B) marketplace.

The model can now be described as follows:

1. **Aggregators**. In the aggregation model, one company aggregates buyers to form virtual buying entity and / or aggregates suppliers to constitute a virtual distributor. For example, in the science marketplace, one compnay became the central buying location for thousands of buyers to implement their own purchasing rules and obtain volume discounts.

   The aggregator takes the responsibility for selction and fulfillment, pricing, and marketing segmentaion. Another example is an electronic company that offers a total home buying service, from search to financing, under one site.

2. **Hubs or process integration**. Hubs or process integration focusses on producing a highly integrated value proposition through a managed process. Hubs have been defined as neutral Internet-based intermediaries that focus on a specific industry or a specific business process. Hubs host electronic markets and create value by reducing the costs of transactions between sellers and buyers.

   There are examples of vertical hubs that serve a vertical market or a specific industry, such as energy, steel, telecommunications, and plastic. In contrast, functional hubs specialize in horizontal markets across different industries. Functional Hubs focus on Business processes such as project managemeng and MRO (*Maintenance, Repair and Operating, and procurement*). An electronic business company that provides office supplies to many industries is a good example of a functional hub in B2B commerce.

3. **Community or alliance**. In the community model, alliances are used to achieve high value integration without hierarchical control. Members and ene-users paly key roles as contributors and customers. Basically, communities produce knowledge with economic value, such as *Linux, MP3*, and *Open Source*.

4. **Content**. Content is the end product of this model of B2B commerce. It has the purpose of facilititating trading. Revenue can be generated from subscriptions, membership or advertising. For example, there are e-companies that sell information about contracts to bid market intelligence and analysis, and jobs by industry.

5. **Auctions or dynamic pricing markets**. Auctions or dynamic pricing markets handle complex exchanges between buyers and sellers in B2B commerce. Auctions (e.g. English, Dutch, Vickery, Reverse) are dynamic and efficient mechanisms for mediating and brokering in complex marketplaces, like supply-chain and procurement systems Bundle

auctions allow agents to bid for bundles of items and are useful for B2B applications such as automatic supply-chain or procurement.

In a fully automated B2B exchange, multiple buyers and sellers competitively bid on commondities or standaradized products, and the buy and sell orders are matched automatically *paperexchange.com* is a fully automated B2B exchange. A summary of B2B models is given in following table.

Table 1.5 : B2B Summary

Type	Description	Example
B2B storefronts order fulfillment,	Provide businesses with purchase,	*Staples.com*
	And other value-added services.	*OfficeDepot.com*
B2B vertical markets specific industry.	Provide a trading community for a	*HotelResource.com*
B2B aggregators business purchasing	Provide a single marketspace for	*MetalSite.com*
	From multiple suppliers.	
B2B trading hubs vertical markets.	Provide a marketspace for multiple	*VerticalNet.com*
B2B Post and browse and sellers to entermarkets *TechEx.com*	Provide a marketspace for buyers *CreditTrade.com*	*CATEX.COM* competitive bids on contracts.
B2B auction markets and sellers to enter competitive bids on contracts	Provide a marketspace for buyers	*e-STEEL.com* *HoustonStreet.com* *Altra.com* *FreeMarkets.com*
B2B fully automated and sell contracts	Provide a marketspace for the automatic Matchingexchangesof standardized buy	*PaperExchange.com*

Another business model similar to B2B exchange model is the Business-to-Government, or B2G procurement model, B2G e-business such as *eFederal.com* and *Gov.com* in the US are hoping to tap the $18 billion per year market for governemtn procurements that do not require a bid.

Not only do businesses sell directly to consumers and other businesses online, but consumers are now interacting with each other to buy, sell, or trade products, personal services, or information.

Consumer-to-Consumer (C2C)

With the C2c e-business model, consumers sell directly to other consumers via online classified ads and autctions, or by selling personal services or expertise online. Examples of consumers selling directly to consumers are *ebay.com* (auction) and *TraderOnline.com* (classified ads).

There are also a number of new consumer-to-consumer expert information exchanges that are expected to generate $6 billion in revenue by 2005. Come of these exchanges, such as *AskMe.com* and abuzz, are free, and some allow their experts to negotiate fees with clients, *InfoRocket.com*, one of the first question-and-answer marketplaces, is driven by a person-to-person auction format. The *InfoRocket.com* bidding system allows a person who submits a question to review the profiles of "experts" who offer to answer the question. When the person asking the question accepts an "experts". Who offer to answer the question. When the person asking the question accepts an "expert" offer, *InfoRocket.com* bills the person's credit card, delivers the answer, and takes a 20 percent commission.

Consumer-to-Business (C2B)

The C2B model, also called a reverse auction or demand collection model, enables buyers to name their own price, often binding, for a specific good or sergice generating demand. The website collects the "demand bids" and then offers the bids to the participating sellers. *ReverseAuction.com* (travel, consumer electronics) and *priceline.com* (travel, telephone, mortgages) are examples of C2B *e-business models*.

E-business Models Based on the Relationship of Transaction Types

This business model is essentially ruled by the following two parameters:

On the basis of value addition. Value addition is the addition of value to a product or service because of the opportunities that it offers on the Web.

On the basis of Control. At the high end of control there is hierarchical control and at the low end there is no control, so that it is self-organizing. Normally, the control is done throught the policies of the website.

Based on these, nine types of transactions can be identified as listed below:
- **Brokerage**
- **Aggergator**
- **Info-mediary**
- **Community**
- **Value chain**
- **Subscription**
- **Manufacturer**
- **Advertising**
- **Affiliate**

These transaction types take place in a variety of ways. Moreover, any given firm may combine one or two of these as part of its Web business stragegy , following fiture dipicts the Transaction Model.
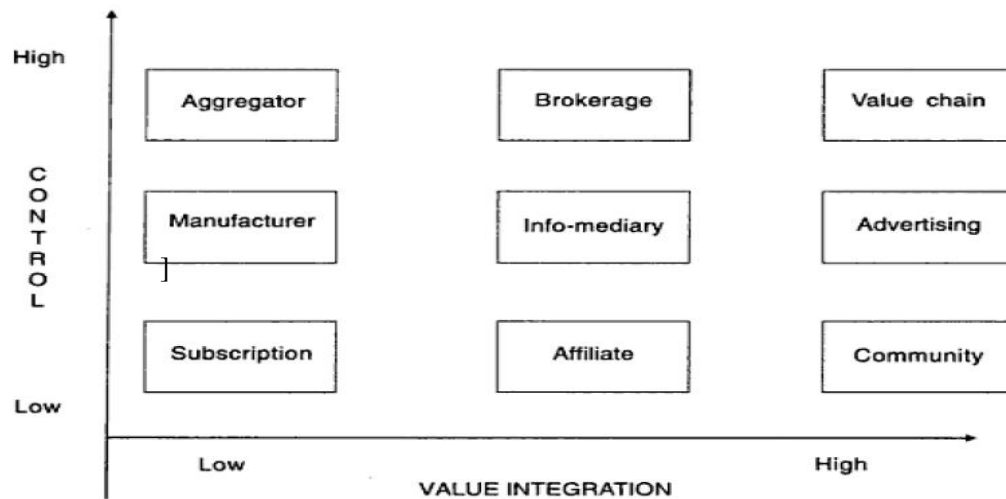
Figure 1.13: Transaction Model

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Brokerage Model

The characteristics of the brokerage model are as follows:
* The price-discovery mechanism is its key-principle
* It is a meeting point for sellers and buyers
* Auctions and exchanges are the modes of transactions
* It is a 'Free Market'
* It consists of Global Network of Buyers and sellers
* It is a virtual Marketpace enabled by the Internet
* If ecompasses all types of organization now

Advantages of the Brokerage Model

Following are the advantages of the brokerage model:

* C2C trading
    (a) Allows buyers and sellers to trage directly bypassing intermediaries, and
    (b) Reduces cost for both the parties.
* Global reach
* Trading convenience, which
    (a) Allows trading at all hours, and
    (b) Provides continuity updated information.
* Sense of cimmunity through direct buyer and seller communication.
* Efficient access to information
* Alleviation of the risks of anonymous trading.

Brokerage—Price Discovery Mechanisms

There are three kinds of price discovery mechanisms, which from the basis for the brokerage model. They are:
      1. *Auction*
      2. *Reverse Auction*
      3. *Market Exchange*
Some examples of price discovery mechanism based models are:

- B2B
    - B2B sell side *FastParts.com*
    - B2B buy side *FreeMarket.com*
    - B2B exchanges *Covisint.com*

Some Indian Brokerage sites are:

www.baazee.com
www.automartindia.com
www.steelexchangeindia.com
www.indiacar.com

Of the three mechanisms listed, the first two—auction and reverse auction—can be discussed below.

Auction broker. Many different auction formats have emrged since the first auction occurred in *Babylon* in about 500B.C Today, different auction formats are aggregated on certain common attributes. There are open and sealed-bid auctions. There are auctions where the price descends at regular intervals. There are single auctions and double auctions.

English auction. The english auction is one of the most common auction formats. It is also known as the open-outcry auction (a type of auction made by group of people) or the *Ascending-Price Auction*. It is frequently used for selling art, wine, and other physical goods, which do not have a limited lifetime.

The english auction is defined in the following way: the auctioneer starts off auction with the lowest acceptable price or the reverse price. He then reserve bids from the bidders until the point from which there is not raise in the bid. At that point, the auctioneer '*knocks down*' the item, which indicates theat the highest bidder will receive the item in exchange for the sum of money he bid for. Sometimes, the reserve price will not be made known to the public. This may happen when the auctioneer is uncertain about the price expectation of the bidders and when he wishes the bidders to totally set the price level. As a consequence of not giving the reserve price, the item will never be sold if the highest bid is lower than the reserve price. He then receives bids from the bidders until the point from which there is no raise in the bid. At that point, the auctioneer 'knockes down' the item, which indicates that the highest bidder will receive the item exchange for the sum of money he bid for, sometimes, the reserve price will not be made known to the public. This may happen when the auctioneer is uncertain about the price expectation of the bidders and when he wishes the bidders to totally set the price level. As a consequence of not giving the reserve price, the item will never be sold if the highest bid is lower than the reserve price.

The bidders are often anonymous, especially if the bidding occurs through electronic means, this is done to preserve the identity of the bidders. A well-known bidder may increase the price expectation of the product just because a person known to him has entered a bid. He may be his business rival. Therefore this kind of bidding will not be beneficial for the bidders. The seller might benefit from a 'non-anonymous' bidding process, if he wants to acquire the highest price possible. We must neverthless keep in mind that some bidders might not join this bidding process which can result in a lower finel price for the seller.

In a traditional physical auction, the auctioneer can hightgly influence the bidding process. He can manipulate bidders with his voice, his gestures, and his personality. Manipulation can to know each other, discuss topics of mutual interest, and petition one another for information. These bulletin boards are public forums that encourage open communication between users. *eBay* also encourages open and honest communication between the community and the company. Frequently, the members of the community organize grass-root movements to improve the environment in which they work and play. More than 60 million auctions have been completed on eBay since its inception. Following figure describes the eBay model.
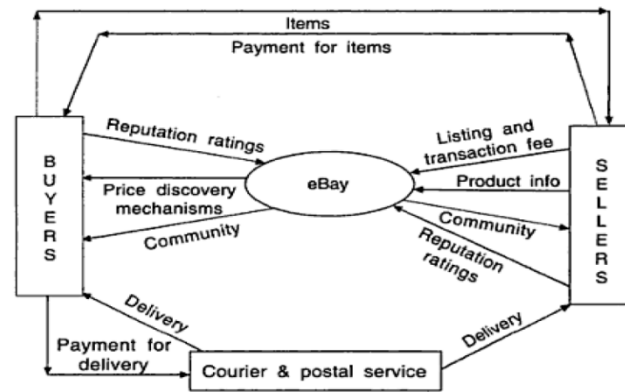
Fig : eBay Model

The key to eBay's success if the trust between the buyers and sellers who make up the eBay community, and the trust between the user and eBay, the company. To overcome electronic information exchange exclusive to one-to-one trading, the Feedback Forum.

How Does one bid?

First, the user needs to register as an eBay member. The registration is free and takes only a couple of minutes. The user can then enter the auction field using his id and password. The person has to carefully look for what he is bidding on. Consider, for example, an item which costs $20.00. enter the maximum bid in the bid box at the bottom of the page. Then click on the "Review Bid" button. eBay will now bid on behalf of the person, up to his maximum bid. The credit card should be placed on file with eBay. The seller, for his part, can sit back (after entering his id and password) and watch the auction.

Security. You can insantly check the reputation or business practices of anyone at *eBay*.the Feedbaack Forum is a place where users leave comments about each other's buying and seling experiences at eBay. A bidder checks his seller's Feedback Profile, before he places a bid, to learn about the other person's reputation with the previous buyers. If a person is a seller, he follows the same procedure with the bidders.

Every eBay purchase is covered by insurance, free of charge under the terms of eBay's program. If a person paid for an item and did not receive it (or if hs has received the item in a form unline), eBay will reimburse or pay back money to buyers up to $200, less the standard $25 deductible.

An escrow (an agreement of money between two person or organisations) service provides added security to both the buyer and the seller, in transactions involvong expensive items. eBay's escrow partner i-escrow, will hold the payment and send it to the seller only after the merchandise has been inspected and given approval by the buyer. The seller also is given the opportunity to inspect and approve a returned item before the buyer gets the refund.

Reverse Auction

The reverse auction business model is decribed on the priceline website. Priceline.com has pioneered a unique type of e-commerce known as a "*demand collection system*" that enables consumers to use the internet to save money on a wide range or products and services while enabling sellers to generate incremental revenue. Using a simple and compelling consumer proposition—"name your price", they collect consumer demand (in the form of individual customer offers granateed by a credit card) for a particular product or service at a price set by the customer and cummunicate that demand directly to participating sellers or to

their private databases. Consumers agree to hold their offers open for a specified period of time to enable priceline.com to fulfill their offers from the inventory provided by the participating sellers. The fulfilled offers generally cannot be cancelled. By requiring consumers to be flexible with respect to brands, sellers and / or product features, they enable sellers to generate incremental revenue without disrupting their existing distribution channels or retail pricing structures.

Priceline.com was founded in October 1997. It launched its website in april 1998, trumpeting or announcing the idea of buyer-driven commerce as a way to use the Internet to secure the lowest possible price on airline fares. Patent claims have been a key factor in driving with customers in areas of airline service industry, automobile industry, hotel reservation services industry, home financing services industry, adaptive marketing programs, and through website banner referral.

By creating these alliances, priceline.com has been able to capture the market in these various service ares, using their patented "name your price" business model. With competition growing, such alliances have merely given priceline.com an advantage. Alliances formed in the automobile industry are with both new and used car dealers and with car rentals. *Ford, Honda, Nissan* are a few brands available on priceline.com. some firms have allied with priceline.com for their rental car business. The Affiliate Network Program enables the qualified independent websites to place the priceline.com hyperlink on their site, any referral from an independent website to priceline.com that results in business for priceline.com, receives $10 for first time qualified user and $1 for subsequent users.

Priceline.com has adaptive marketing programs with numerious companies. These programs facilitate a revenue stream based on a referral programs with numerous companies. These programs facilitate a revenue stream based on a referral basis. There are also thrid-party participants who enable priceline.comto develop. These third parties are indirect alliances. *Priceline.com* depends on the use of the third party's computer systems. Some of these computer systems include: the central computer system for hotel and airline reservations, Lending tree Inc. for home financing, the fact of experience &communication for infrastructure, Web and database servers, and *CallTech* Communications Inc. for call centre. Priceline.com's major sourses of revenue are derived from the following areas:

- **Airline ticket reservation services**
- **Hotel ticket reservation services**
- **New auto purchasing**
- **Home financing, Including mortgages, refinancing, and equity loans**
- **Licensing patents**

Priceline's competitive advantages lies in its "name your price" business model. It is the world's first buyer-driven commerce system, and benefits both consumers and sellers by providing a unique platform where demand and supply meet. The model is fundamentally different from any other form of electronic commerce and it seems to revolutionize the way people shop for products.

Aggregator Model

Classic wholesalers and retailers of goods and services are increasingly referred to as "e-tailers". Sales can be made based on list prices or through auctions. In some cases, the goods and services are unique to the web and do not have a traditional "Brick-and-Mortar"storefront.

Fig : Traditional Business Model
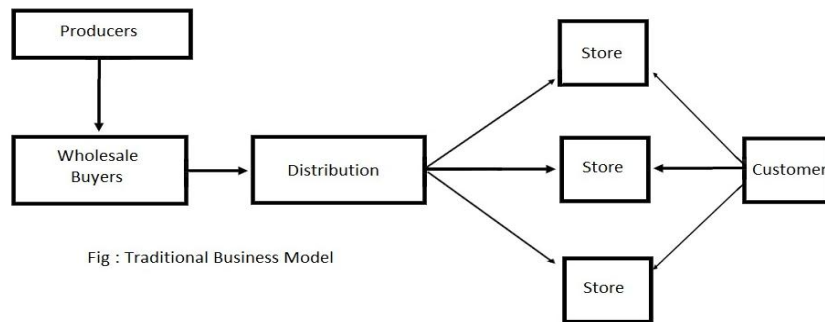
following are some of the aggregator models:

1. ***Virtual merchant.*** This is a business that operates only from the Web and offers either traditional or Web-specific goods and services. The method of selling may be by list price or auction. An example of a service merchant is Facetime, which calls itself an "application service provider". It offers live customer support for e-commerce websites (*e.g. amazon, eToys, Eyewire and OnSale*).

2. ***Catalogue merchant.*** Catalogue merchant is the migration of mail order to a Web-based order business (*e.g. Levenger*).

3. ***Surf-and-turf.*** This is a traditional brick-and-mortar establishment with Web storefront. The model has the potential for channel conflict.

4. ***Bit Vendor.*** This is a merchant that deals strictly in digital products and services and, in its purest form, conducts both sales and distribution over the Web.

5. ***Subscription model.*** In this, the users pay for access to the site. High value-added content is essential (*e.g. WallSt. Journal, ConsumerReports*). Generic news content, viable on the news-stand, has proven less successful as subscription model on the Web.

What Do Aggregators Do?

Based on the electronic marketplace, theaggregator model by passes distributors so that the buyers and sellers come together. Following figure can help you form an idea about the model

Fig : The Aggregator Model
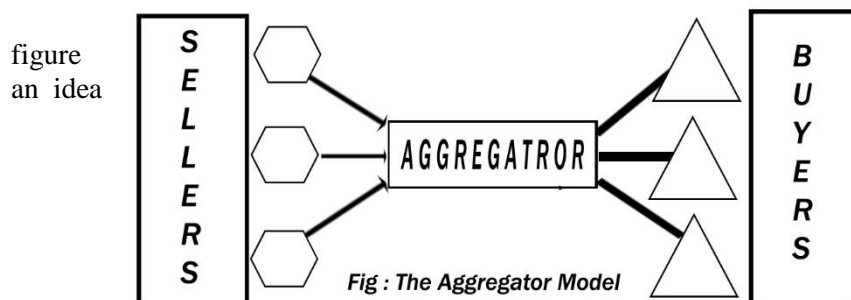
To be more precise, the aggregators are the connectors between the buyers and the sellers. They are involved in the overall process of selection, organization, matching the buyers' requirement with

the particulars of the available goods, fulfillment of the orders and enabling the customers to create a value about the sellers.

there are four types of aggregators such as the following:

1. ***Content aggregators***. They are among the first Large-Scale sites on the Web and mostly represent large publishing companies, e.g. *pathfinder.com*. their basic challenge is that content has to be attractive enough to make the site viable. For example, *CANOE* and *Hockeyplus*, that provide extensive statistics, analysis, pool information or *cricinfo.com*.

2. ***Mainstream aggregators***. These include sites like yahoo providing a Web directory and a search engine, along with a bunch of attractive tools like e-mail addresses, home pages, reminders, and many others. The most attractive feature of these sites is that they have an 'Easy-to-Remember' URL which is one of the reasons for them to be the top traffic sites on the Web.

3. ***Event aggregators***. These are site that provide in-depth content and tools tailored to the needs of a particular group, which doubles as a clearly defined customer base, for example, mortgages—build tools, rates, advise, and the ability to purchase mortgage online in the same place (Microsoft's *HomeAdvisor* or *HomeShark*).

4. ***Shopping aggregarors***. Shopping aggregators let consumers roam through hundreds of sites and catalogues and find the best price in seconds. They help comsumers sift through dozens of e-commerce sites. For example, ***compare.com*** and ***bizrate.com*** evaluate their quality on independent basis as in the case of consumer reports.

E-commerce is forcing changes in the distribution channels that require all parties—manufacturere, distributors, retailers,consumers and logistics companies—to evaluate their value proposition and develop capabilities that will meet the evolving demands of the Internet age.Implications for manufactureres, other challenges and opportunities of e-commerce are that, it:

1. Requires investment in marketing directly related to the consumers so as to sustain customer loyalty to their brands.
2. Relies on consumers support for the sale of products.
3. Requires brick-and-mortar enablers to function as a distribution center for local delivery and returns, and for regular retail activity.

The distribution channel and logistics infrastructure remains largely unchanged for products that are either perishable (a food product needed to kept in cool place) or require contact with the product prior to selection.
The changes generated by e-commerce present equally significant opportunities and challenges for logistics and transportation companies such as GATX, ASD Systems, Logistix, *Clickship.com*, and a host of others that have sprung up or started to leverage the capabilities of the Internet.
The implications of the model are that, for the growth of the ability to realize the potential for Internet-generated demand for delivery from local brick-and-mortar enablers, the same-day pickup and delivery infrstructure, will need to evolove rapidly. The fragmented nature of the same-day puckup and delivery service has limited acheivement of delivery density, productivity and proper marketing to reduce the cost of service.
Logistics and transportation enable who can use the same levelof technology, marketing, operational planning, management talent to same-day service that has fuelled the growth of the express market, will find that the pent-up demand for this service with e-commerce models can be greater than what *Frederick Smith* envisioned for overnight service when he launched Federal Express.

The capabilities needed for this model are:
- Greater investment in the brick-and-mortar infrastructure.
- Handling of inbound freight for finished goods.
- Management of a more traditional distrubution network with truckload and less-than-truckload deliveries to local distribution centers.
- Optimization of stores to support customer visits to view new products and to handle exchanges and returns.
- Integration of the existing retailers with the online channel for sales to e-consumers.
- Handling the same-day delivery of goods and pickup returns.

Chennaibazaar.com

Chennaibazaar was officially launched on 28th Dec. 1998, initilaly offering e-commerce services to chennaites. It is a B2C gifting and a retail shopping website. This was the first shopping mall to be launched from Tamil Nadu. The name chennaibazaar was coined, keeping in mind that its services and operations would be conrfined only to chennai.

Chennaibazaar started with a listing of more than 2000 departmental products, which a chennaite could select from and get delivered at his doorstep anywhere in chennai, absolutely free of cost. This was a cash-on-delivery model.

In june 1999, chennaibazaar was completely restructed to target only the chennai-based NRIs, who could send gifts like cakes, flowers and sweets to their friends and relatives in chennai. This concept became a major hit with a hign growth rate in terms of the number of customers. Chennaibazaar.com from then onwards started to be known as the green site.

Gradually, chennaibazzar extended this service all over india and now it is very popular among NRIs from all over the world. Through the domain says chennai, it has exteded its service to more than 45 cities all over india.

Therefore, even though the website was set up on a modest scale, its operations now are spread all over the world, manily helping indians living abroad to stay connected with their people and their homeland. Chennaibazaar is also now associated with Pioneer Tradings Ltd. In the United Kingdom, where it is operating in the name of Reachhindustan.com.

Though chennaibazaar offers a wide variety of goods for thecustomer to choose from, it also provides the customers with the facility of goods for the customer to choose from, it also provides the customers with the facility of mentionaning any special commodity in their "Request a Product". Chennaibazaar then gets back to the customer to confirm whether the requested commodity can be arranged by it and what would be its price.

The commodity is also then included in their shopping cart to enable the customer to place an order for it.

Most products are purchased from the best known shops in the city, those renowned for their quality. In case a customer wants the item to be purchased from any specific place, chennaibazaar also provides him with the facility of placing a request in their "Request a Product". The website gets back to the customer, confirming the availability and the price of executing this demand.

Website generally askes for a time peiord of 72 hours to complete the delivery withing chennai and for a period of 5 days otherwise, through in some special cases like delivery in talukas and villages the time span may be up to 7 days.

Since the site is an online merchant, it provides a variety of goods and services to its customers. But these goods are not their own. Once the order is placed, the company secures the products ordered from its business partners.

Some of its partners in the various segments are:
- *Perfumes*: Avon, Gillete, Park Avenue
- *Jewellery*: Oyzterbay
- *Chocolates*: Cadbury

- *Sarees*:   Apoorva
- *Clothing*: Furore, Vanford
- *Watches*:   Casino, Titan, Timex
- *Electronics*:   Carrier, Kodak, Godrej, Phillips, Sumeet, BPL, Samsung, LG
- *Health Checkup*:   Apollo Health Checkup

Chennaibazaar.com's merchant Banker is *securetrading.com* and they follow stcrict srcurity guidelines as follows:

1. *Digital signatures.*   Digital signatures are used throughout the system in order to ensure that transactions arriving at a gateway are from an identifiable merchant, and that any information passed back to the merchant is from a SECURETRADING gateway.

    Each signature uniquely identifies it s source. Gateways also communicate with each other and with the control system using such digital signatures. In the event that a merchant's digital signature becomes a security risk (e.g. if their server is stolen), the appropriate signature is immediately revoked and it will no longer function within the system.

2. *Encryption.*   All communication within the system is strongly encrypted using 2048-bit RSA encryption with variable 168-bit session keys (i.e., each transaction uses a new key). This is significantly (many billions of times) more secure than the standard browser SSL security provided by, for example, Internet Explorer.

    SECURETRADING encryption is also much more secure than that specified for the SET (Secure Electronic Transaction) protocol. The high level of encryption used is forecast as not being a requirement until the year 2015. The encryption is of course totally transparent to the merchant and his / her customers.

    All payments are accepted through credit cards only. The credit card details are accepted throught the SSL protocol. All transactions are secured, powered by CGI script capable of procesing credit card transactions, ensuring that the information is encrypted before it is transmitted. The credit cards accepted are Amerian Express, VISA, Master Card, and Discover.

    Goods are delivered all over the would through FedEx. For delivereis in India, items are delivered through the courier service. Every care and precaution is taken to ensure proper quality and timely delivery of the items. Delivery is made on the date specified. Deliveries on Sunday are available only for chennai.

    Special delivery charges have to be incurred by the customer in case of delivereis to places like the USA, Canada, etc. In case of any delay delivering the product, the company is liable only to the extent of the price of the product.

Automortindia.com

Founded in August 1999, Automartindia Ltd. Is a typical brick-and-click joint venture, floated by the Mahindra Group, *Mahindra Information Technology Services Ltd* (MITS), *Housing Development Finance Corporation* (HDFC) and the established auto dealers, Sah and Sanghi. The company is headquartered in Mumbai. The company has outlets at prime locations in mumbai, Delhi, Bangalore, Chennai and Pune.

Automartindia Ltd lists two primary objectives:

- To simplify the process of buying and selling automobiles in the Indian automotive space.
- To provide a high level of transparency and credibility in the used car market:
   Virtues sorely lacking in the current scenario.

To this end, Automartdindia Led. Offers its customers a range of services—from choice of a certified vehicle, to certification, finance and registration, insuarance, insurance, valuation, etc.—that simplify the entire process and helps them make informed sales and purchase

decisions. Automartindia Ltd. Is in a unique position to leverage its intrinsic strengths and create a unique alignment of the interests of purchasers, sellers, dealers, automobile associations, and manufacturers.

Automartindia recognizes that a car in the India context is much more than just transportation. It is a symbol of achievement, recognition of value and a major milestone in the life of most of our targe groups. Hence automartindia has positioned itself as a companion that helps its customers achieve this milestone with the least possible discomfort.

Services Offered

The services offered by Automartindia are:

1. *Used Vehicles*. Automartindia has the largest online inventory of used cars from over 70 cities in india. Moreover, its retail outlets are equipped to display at least 50 small, medium and premium segment cars at any given point of time.

   Towards providing credibility and transparancy in the highly disorganized used car market, automartindia certification program works at two levels. While the used car buyers can ensure what they pay for is what they get, the sellers can actually sell their vehicles faster by avoiding prolonged negotiations and haggling once they have put all their cards on the table.

2. *New vehicles on the site*. Automartindia offers its users a range of new cars from small family cars to premium sedans (a car with seats for 4-5 people). This is coupled with other helpful services like online reviews and technical statistics that users can avail of on the site. They can also run a dealer search to find the dealer closest to them.

   Perhaps the most daunting task in the transaction of used vehicle is the paperwork that needs to be done. Automartincia ensures complete documentation at the time of procurement itself. Besides this, a check on accident history is also done. Automartindia has tie-ups with financial institutions for consumer. Loans.

   This product has also been developed to plug a huge need gap in the used car business. Warranty is provided for a period of 6 months or 8000 kms (which ever is first). This is provided as per the original manufacturer guidelines, thus ensuring that the same service standard is maintained for the car. This is a comforting factor for consumers of used cars. All this comes free to a consumer, through its "portal", automartindia offers:

   1. C2C trading: sellers put their offerings online, buyers browse for the best possible opportunities, the buyer contacts the seller and then the two close the deal offline.

   2. B2C trading: Dealers put their offerings, both new and used cars, on the website, offering special discounts. The buyers may choose from this range as well.

   3. Online Store: The website offers accessories online through its dealer network.

   4. Physical presence: The company has a dealer network spread across the contry and company-owned outlets in 5 cities, where the buyers can physically verify the condition of the cars.

Partner	Value added

Hyundai Motors   HTML has tied up with automartindia for its exchange
programmes.

      India Ltd.   Under this programme, any customer walking into a Hyundai
showroom can get his card valued cand choose a brand new
Hyundai product of his choice. This scheme compliments both
companies because a customer walking into the showroom can sell
his vehicle to automartindia and in excyhange drive away in a
brand new Hyundai car.

General Motors India(GMI)   automartindia has tied up a strategic relationship with General
          Motors tolaunch used car outlets with GMI and its dealers.
          Automartindia would provide their skill and expertise, and
          GMI and its dealers would provide the infrastructure.

Indiatimes.com   For developing the used car market, automartindia has tied up
          with the horizontal portal, indiatimes, to operate the car sales
          channel for them. This way, automartindia caters to the
          registered users of Indiatimes as well.

Info-mediary model

An organizer of virtual community is called an information intermediary or info-mediary, who helps sellers to collect, manage, and maximize the vaue of information about consumers. Data about consumers and their buying habits are extremely valuable, expeically when that information is carefully analyzed and used to target marketing compaigns. Some firms are able to function as info-mediaries by collecting and selling information to other businesses. An info-mediary may offer users free Internet access (e.g. *NetZero*) or free hardware (e.g. *eMachines.com*) in exchange for detailed information about their surfing and purchasing habits. Thie is more likely to succeed than the pure advertiseing model (Refer the Figure).

The info-mediary model can also work in the other direction, i.e. providing consumers with useful information about the websites in a market segment that competes for their dollar. Info-mediaries are in information business, implying that they competes on their ability to capture and manipulte information in a manner that adds value for their clients, who could be sellers or buyers.
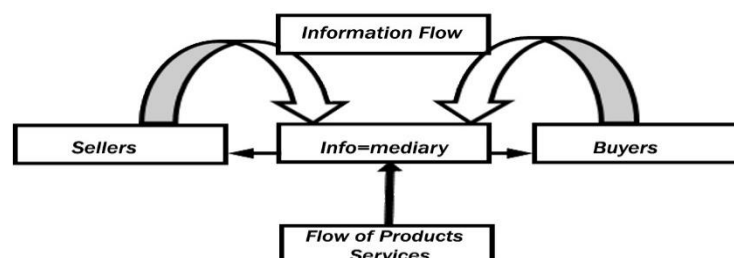
Figure 1.14 : Info Mediary Model

A real info-mediary provides information services by capturing information from both sides of a transaction. They do not own the products or services thatare shipped directly from

suppliers to customers. Many info-mediaris roday follow business models that generate revenue from the deeper pockets on the seller side.

These models could be in the form of exclusive contractual arrangements whereby the info-mediary is the leader in finding customers for a seller. Membership fees for participating in an electronic market could be another source of revenue.

However, more common models involve advertising (screen) space, number of user page views, and transactional revenue, whereby a certain percent of sales goes to the info-mediary.

Buyer-based revenue sources are relatively rare but can be expected to increase over the next few years as info-mediary services become valued in online shopping environments characterized by increasing choice, complexity, and information overload.

Such sources could include membership of subscription fees, allowing access to valued information or services, a transactional percentage, or fees based on services, such as connecting a seller to a buyer and ensuring privacy protection. An infor-mediary front end to the web could help protect consumers from unsolicited mailings and confusing product selection.

Value Addition

An analysis of the general info-mediary business model reveals that info-mediaries create and add value for the customer duding several critical phases from the initial search of the supplier and product comparision (as to whether it fulfils the requriements) to the actual transaction and ultimate product or service delivery (sales fulfillment). To support the initial phase, info-mediaries leverage the potential of the Internet to provide almost unlimited expansion of search space for consumers, thus overcomig the limitation of physical space inherent in traditional brick-and-mortar operations. Whilc the conventional store carry only the most popular items, amazon.com offers millions of items, most of which are sought only by a relatively few customer with specialized tastes.

Buyers can certainly expand their search space through search engines, but a more organized universe provided by info-mediaries is generally preferable. For example, at *yahoo.com's* shopping area *andamazon.com'szShops.com*, buyers can search thousands of stores and millions of products. Aggregating a large number of suppliers, these info-mediaries save buyers' invaluable hours on tedious piecemeal searches through direct use of search engines. Ironically, the bringing toghether of buyers and sellers becomes increadingly necessary as the search space grows larger. In this sense, info-mediaries create and prepetuate or to cause something to continue their own demand.

Finally, info-mediaries also provide valuable assistance to buyers to make their purchasing decisions, by offering "suitable" suggestions. This function is supported by technology for one-to-one marketing based on online customer profiling. *Amazon.com* not only anticipates book-buyers'comments about the bok on sale.

This analysis reveals how info-mediaries help buyers expand, organize, and optimize their search spaces with information and information technologies. For some products, including books, CDs and flowers that are small in size and relatively easy to ship, info-mediaries provide support through bot the requirements and the axuisition phases. Thus, we identify two dimensions—vertical and horizontal—underlying the manner in which info-mediaries add and create value, as represented in the form of an info-mediary value grid: the vertical dimension is the acquisition cost.

The text 'products' in figure of info-mediary model (the bottom-most block) refers to typically information-intensive items such as books, CDs, and houses. Flowers are not information-intensive, but infor-mediareis like 1-800-*Flowers.com* expand buyers' search spaces by locating a florist to deliver flowers anyshere in the world on their behalf.

Similarly, the search space for PCs is also enlarged, since buyers readily specify any desired PC configuration, often impossible to work out in a brick-and-mortar store. Home

buyers can also benefit from info-mediaries such as *Realtor.com*, to navigate rhe range of selections. To complete an acquisition however, they need to work with local realtors collaborating with Realtor.com. for certain segments of the population (such as people who are just too busy), frequent trips to local stores to buy common household items and other daily necessities are inconvenient.

Start-up info-mediaries like *Kozmo.com* and *Webvan.com* provide value to busy people by helping them save time in doing their daily chores. Kozmo.com advertise itself by saying:"Delivery to you in under an hour."

Classification of Info-mediaries

Info-mediaries like Kozmo.com can be classified, in terms of their relatiohships with sellers and buyers, into four types based on whether these relationships are open (non-proprietary, giving anyone free access) or closed (proprietary, restricting access). Closed relationships imply a certain relationship-specific investment (such as membership fee), and parties making that investment expect a return. The four types of relationships are:

1. *Specialized agents*. The related proprietary network are sectioned off the broader Internet by having closed relationships with both buyers and suppliers. Entering the info-mediary's domain requires incurring cost on the part of buyers and sellers alike, usually in the form of a fee or a certificate that they satisfy a certain membership profile. These info-mediaries usually manage a specialized market; their business performace depands on their ability to deliver value through scope (sufficient numbers of sellers and buyers), specialization (a well-defined and lucrative niche), and infrastructure (a platrofm for transactions).

2. *Generic Agents*. These info-mediaries maintain open relationships with both buyers and suppliers and involove no relatoinship-specific investment. Examples include search engines *Hotbot.com* and *Google.com* that provide open search capabilities to any buyer looking for a supplier. The info-mediaries create valuable through their comprehensive and unbiased service, often generating revenue from advertising, which is priced based on eyeballs or number of unique user clicks, and the value of screen real estate, some info-mediaries like *Yahoo.com* attempt to create additional stickness by providing community and personalization service. Others like *Bizrate.com* provide customers a rating system on various e-tailers' ability to deliver promised services.

3. *Supplier agents*. Many info-mediaries start off in this quadrant, sponsored either by specific companies with a vested interest in selling their products or by close affiliation to the core group of sellers. Thus, they do not provide unbiased or able to judge options for buyers. Major auto manufacturers, for example, host their own websites.

   Prior to offering other stock and mutual funds from a number of direct competitots, the *Charles Schewab* website started off as a supplier agent providing access to only its own products. The sustainability of these info-mediaries depends on the quality of suppliers they include, provision of benefits to buyers, and the ability to maintian a good infrstructure and seamless exchange platforms.

4. *Buyer agents*. These info-mediaries establish relationships with a core set of buyers. Working on their behalf and any number of suppliers. To succeed, they must build a large base of clients, at the same time, winning their trust. However, extracting valuable information and constructing information pforiles, deep and broad enough, to create substantial value for clients is a slow process. The value of each client increases as more and more clients join the service.

Since trust is often correlated with branding, and the ability to build profile (the strength of some pure-play Internet companies), we can see alliances between branded companies like Disney and pre-plays like *Infoseek.com* in order to create info-mediaries like *Go2Net.com*.

Evolution of Info-mediaries

Many early info-mediaries were sponsored by a seller or a group of sellers wanting to participate in the e-commerce environment, where it is the agent's best interest to sell the supplier's products. Their affiliations with suppliers are strong but weak with buyers, who may not value a biased market of limited scope.

The negative spiral could force such info-mediary, effective in providing value-added services, establishing partnerships that extend its product line and promoting its website, could generate a critical mass of both consumers and suppliers sufficient to reverse the cycle greater product and service scope attracts more buyers, and in turn more suppliers.

A larger supplier base naturally reduces the affiliation of the info-mediary vis-à-vis the few original sponsors. In contrast, the info-mediary does not compete on margin but on its ability to deliver information and provide navigation and other value added services to buyers. It might therefore be expected that info-mediary evolution will be towards greater buyer affiliation and buyer sources of revenue.

Some Examples of Info-mediaries

1. Typical of generic agents, *yahoo.com* provides comprehensive search facilities for both suppliers and buyers. However,l such services eventually favour buyers. For example, if you search for the *Prudential Insurance Co*. from *yahoo.com*, you will find the company's web address.

   Also, you will also be linked to yahoo's "Insurance Center" where you can fill out a form to get quotes from insurance companies other than Prudential. The extend to which the process for obtaining quotes is tryly competitive is the extend to which yahoo acts as a buyer's agent. To be truly effective in helping clients expland, organize, and optimize their search spaces, info-mediaries inventably evolve to be the buyer agent.

2. In response to the Information explosion challenge for the chain-pharmacy industry, *chainDrugStore.net* entered the B2B marketplace as a state-of-the-art "info-mediary" hub and the wholly-owned subsidary of the NACDS. Through the *chainDrugStore.net*, retailers and manufacturers will be able to streamline and target the flow of communications, saving time and money in the current way they do business.

   For product buyers, this means being able to analyze better and manage information and make more effective purchasing decisions. They can instantly receive the product information they require when they ask for it. Suppliers can also reach the right person with the right message at the right time.

3. *Deja.com* is the first website to unite all of the essential product research and buying tools that consumers seek in one integrated, intelligent and intuitive or based on feelings rather than facts service. Several product ratings and reviews, professional reviews, in-depth product specifications, hightly intuituive product comparision tools, discussion forums for personalized product inquiries and a comparision shopping service, far surpass competitive services currently available to consumers.

   Deja.com is a leading provider of comparision shopping resources, the company offers consumers two powerful web-based services—the Precision Buying Service and the Usenet Discussion Service. It is widely known for its franchise in consumer-generated content, its role as a trusted intermediary, reliable brokering, and unbiased information on products avilable for purchase on the Web. Its Precision Buying Service is the company's promary offereing and is a full-featured buyer's portal that provides consumers with a

complete set of tools and resources for determining what products to buy and where to buy them. This service is the first to bring together in a highly integrated environment, all of the components that consumers need to make smart buying decisions. *Deja.com* offers its services to sonsumers free-of-charge, and derives its revenue from advertisers and e-commerce merchants.

Community Model

"Community" is an Internet buzzword these days. The dictionary defines it as
(a) A unified body of indivduals….
(b) The people with common interest living in a particular area, broadly, the area itself.
(c) An iteracting population of various kinds of individuals in a common location….

E-communities (or electronic communities) are formed when groups of people meet online to fulfil certain needs, which include personal interests, trade goods and services, entertain and, seek help. The viability of the community model is based on user loyalty (as opposed to high traffic volume). Customer loyalty can be achieved by building e-communities. First, visitors come and look for information.

Then, they start to contribute to the website by, for instantce, suggesting ways to improve the site or its services. Finally, they work inside website by, for instance volunteering as editors for a message board or by serving on a customer advisory board. Users make a high investment in both time and emotion on the site. In some cases, users are regular contibutors of content and / or money.

Having regular visitors contributes to advertising on info-mediary or specialized portal opportunities. The community model may also run on a subscription fee for premium services.

Functions of Communities on the Web

1. Most people long to be accepted and loved and concered about. These along with a desire to learn cause online communities to attract prople. Word goes around about a discussion going on or about a place to make personal or business contracts and visitors thus are attracted. They may end up joining the community.
2. Communities on the Internet provide information. Since they tend to revolve around around about a particular interest of common task or hobby, they can be the sources for sharing information. And can become deep reservoirs of technical information.
3. Communities also begest loyalty. Members develop the habit of visiting one particular site again and again. They get so used to the site, that they develop a sense of ownership, especially if they are involved in online communication.
4. Communities also build your business. Once people become used to a site, they are quite comfortable making a purchase through it rather than going into unknown territory. Communities build "stickness" (the tendencey to spend a long session at a particular site), and that in turn builds joyalty, which is return builds traffic and trust, and trust is the common currency of business.

Community Structures

Newsletters. Newsletters, can be found structured in several predictable ways as follows:

Newsletters.   Newsletters, by definition are one-way communication. They generally use listsever software that sends the same message to an entire list of people, and handles new subscribers and those who wish to unsubscribe. Listserver software (sometimes called a "listserv") is also the backbone for e-mail discussion lists.

Discussion lists.   One of the best ways to build a sense of community is by e-mail discussion lists. In a typical discussion list, the listever software allows a member to send a message to the list address, and then sends that message to all the list members, all within a few minutes. There are three types of discussion lists:

E-mail discussion list.   all messages from the members are forwarded to other members as soon as they are received. If a particular list is not active several hundred messages could be on such a list. but a larger list with lots of discussion can easily generate 50 to 100 e-mails per day and swamp many users. Lists can be configured so that a moderator approves a message before it is sent to the members. The larger lists usually offer a digest option.

E-mail discussion list digest. The digest collects all the messages sent to the list, bundles them, and e-mails them in one-email to subscibers, either daily or when the accumulation reaches a certain size, depending on how the list is set up. A digest helps control the level of e-mail, but tends to inhibit spontaneous interactions among members on the list.

Moderated discussion list digest.Large discussion lists are eventually forced to limit the quantity and screen the quality of message that go out to the list members. When people receive e-mail from the discussion list nearly every day, they begin to get acquainted with other list subscribers and recognize them by their comments and hobby-horses and idiosyncrasies or way of their behavirous.These various points of view make for a rich sense of community and commonality. If one member shares a problem, another will jump in with a solution that may work out well for the member.

Discussion lists on the Internet number in hundreds of thousands, on every conceivable kind of topic. They are often used for product support and troubleshooting. They can also become support groups. If you sell orthopedic equipment, for example you discussion list could be very valuable to people who share the same need and encounter similar problems.
        If you sell hobby items, a discussion list could be a magnet for hobbyists who are happy to share their stories about radio-controlled airplane models, dollhouse (a small house) collectables (things that people want to collect as a hobby), antiques(something that is special and prior). Training groups and online class discussions are another use.

Bulletin Boards

One of the struggles of e-mail-based communities is keeping "threads" (different topics of conversation) separate, sure, the subject line usually includes the topic, but if you are reading 15 messages a day that are not sorted by topic, things will look disjointed. One solution to this is a web-based bulletin board system. Their great strengths are:
1. Keeping threads separate
2. Allowing posts to be read, searched, and researched later by individuals who may not have been part of the original conversation.

Chat Rooms

Another significant type of community building tool is the chat room. This is a useful source of knowledge and information for any user. As for business people, it has a great utility value sometimes even people from public relations schedule chats and interviews with famous personalities. Such chats may have overwhelming (difficult to fight against something) respeonses and may also gear up businesses for nearly every business, it is prefered that the

chats are scheduled ahead of time so thatenough people gather around for the same topic and have a meaningful discussion.

This may give fruitful results for business starters. If a small business needs a chat room, web hosting services often have no-or-low-cost rooms available. eGroups has a Java-based chat rooms built into their online list areas, if there is a need for occasional facility, but all participants need to register as group members to use the chat room. This gives additional security for the participants.

Necessary Elements for the Community Model

What is really necessary to build a successful community? A lot of care and planning are involved. But be sure to have:
1. A clear focus for the community that makes sense to prospective members.
2. The requisite technicial capability through your own software and hardware or a free service.
3. A proper structure, guidelines, and parameters for the discussion to keep the group on target.
4. A moderator responsible for each group or list.
5. A clear strategy on how the community will benefit your business. Since communities care a lot for maintenance, it has to achieve something to make it worth your while.

The Bottom Line

What effects can you expect a community to have on your business's profit and loss statements? Let us list them out as follows:

1. Customer statisfaction though effective customer support is difficult to believe with, although the availability of customer support will make the product or service more attractive, and therefore enhance sales.
2. Increased traffic leads to increased publicity. Participants or visitors to the site will circulate the word around, and news media will write stories about the site.
3. Repeated use will develop layalty among the users towards the site.

4. Moderating or sponsoring a group puts you in the role of an expert in the industry, and gives you and your business high visibility.
5. Narrowly focussed groups you sponsor (those who have a clear interest in your product or service).
6. When your list is well developed you can earn some advertising revenue from e-mail ads or banner ads, but do not start a list expecting this to be your primary revenue stream—it probably will not develop this way for at least a year or two, if at all.

Building a community can be an extremely valuable stragey in developing your online business. But one warning: if you treat communities as a tool of publicity and betray them later, they will soon become a negatinve force rather than a positive one. Make sure your community building strategy is part of carefully designed business plan that you are committed to maintain over the long term.

The viability of the community model is based on user loyalty (as opposed to high traffic volume). Users make high investments of both time and emotion on the site. In some cases, users are regular contributors of content and / or money. Having users who visit continuously offers advertising, info-mediary, or specialized portal opportunities. The community model may also run on a subscription fee for preminum services.

E-communities—an Indian Overview

For indian surface, the starting point of community is served by the portals, by building community features into their sites, hopes to increase retension stickness, and transactions. Rediff and Sify are the most active in this regard, either building community 'channels' or outsourcing them the idea is to build a community around something Indian. Sify, a typical city-community area. However, horizontal communities tend to be loos-knit while the vertical one tend not to be.

Another major sub-category is general interest communities, focussed on sports, music, medicine, finance, and the like. A plethora or believable of cricket-driven sport sites have been launched. Of these, it is sure that only a few will survive, and they will be the ones with the strongest content alliances, and while there are specialized sites on, say, carnatic music, online medical resources have just got off the starting blocks. The bottom line is that there are few general interest communities that have made a mark with Indian sufers.

Sulekha.com

Anchored aournd the conepts of 'expression', 'interaction' and 'community' that set it apart from scores of other 'portals', 'sulekha' is sustained by contributions of tens of captures like no other, the amazingly diverse and dynamic portriate of the world of modern India and Indians.

The driving theme of Sulekha is 'community'. In addition to building the definitive online Indian community, Sulekha is a pioneer in enabling offline communities through its comprehensive and popular network of city hubs, launched for 25 US cities and with designs to cover other cities around the world soon. Sulekha is the leading provider of integrated online event promotion and management, membership and fund-raising services to offline organizations. Sulekha today is the buggest ticketer of events and movies of interest to Indians, with a successful track record.

Sulekha is part of Smart Information Worldwide, Inc. a fully funded company with operations in Austin, USA and Chennai, India. Sulekha can easily boast of:

- o Thousands of contributors from over 50 countries.
- o Hundreds of thousands more who enjoy reading, watching and writing for sulekha.
- o 500,000+ pages of content, more than 90% contributed by members.
- o Discussions, photographs, articles, art, events, news, reviews, recos, and much more—all of them updated, lates, analytical, informative, and thought provoking.

Sulekha is one of the biggest creatinve and vibrant online communities of Indians and 'a whole cauldron (a round container) teeming (full of people) with creativity, wit and fun'(free press journal). Sulekha offers several ways to contribute. It does not matter if one is a not experienced, everyone is welcome to contribute to sulekha and become a member of its global family of contributors.

History of Sulekha

Sulekha founded in 1998, had a humble beginning. Content for the site has grown purely by word-of-mouth and the intense loyalty of its members. Online participation by thousands evidently helps make the site a vibrant, loyal and dynamic platform.

Sulekha realizes the goal in a profitable manner by creating a flexible and powerful, interactive platrofm that connects Indians worldwide through a variety of popular and powerful services. Here are some concrete examples of how it does it:

Social Capital: Sulekha provides the most popular platform for expression and discussions (articles/columns, coffeehouse, Web logs) that allows exchange of thoughts and opinions. Sulekha has helped raised over $1 million / Rs 5 crores for hundreds of cultural and charitable organizations by promoting and selling tickets for their funds and events.

Economic Capital: Sulekha runs one of the most popular online classifieds services worldwide, which allows for the exchange of products and services among Indians.

Political Capital: Sulekha provides a powerful platform for Indian organizations worldwide to promote and find support for petitions advocating their causes. Sulekha has become a highly sought-after online advertising medium because of its unparalleled reach, unprecendented targeting (by age, gender, city, sub-ethnicity, and income), and integrated offline / online promosions through any of the following avenues:

1. Online Advertising
2. In-theater Advertising
3. Direct Marketing
4. Event Sponsorship
5. Market Research

Sulekha today attract more than 500,000 unique visitors every month using one or more of the services that it offers. Like
1. Event promotion and online ticketing.
2. Membership online
3. Fund-Raising online
4. Integrated website and community development
5. Insurance planes

Value Chain Model

Value chain moves businesses away from discrete streams of data about the product being made to one unified pool of information—one that even extends outside the compnay to suppliers and customers. The goal is to develop full and sealmess interaction among all members of the chain, resulting in lower inventories, higher customer satisfaction, and shorter time to the market.

Generalized Portal: AltaVista as a value chain Model

AltaVista company is the premier knowledge resource on the Internet. With its strong search engine tool and patented technology, AltaVista opens up avenues in the maze of Internet to the richest and the most relevant information on any subject from any nook of the Web world, Web pages, shopoing, up-to-the-minute news, live audio and viedo, and community resources.

By capitalizing on the unique Web-wide features and services, the AltaVista network procides and distinct Internet experience through multiple integrated platforms, as in the following:

1. *AltaVista search*. The world's fastest, most comprehensive search service available in 25 languages with 8 distinct search dimenstions.
2. *AltaVista shopping.com*. The first Web-wide comparision shopping services on the Internet, providing objective price and product comparison features to help users make intelligent purchasing decisions.
3. *AltaVista Live*. The only real-time, customizable contents source on the Web, linking content channels on topics such as money, news, sports, entertainment, and more.

4. ***AltaVista raging bull***.   The Web's stickiest site, which has the Web's most active community of message boards, with an emphasis on finance.
5. ***AltaVista free access***.   One of the fastest growing ISP services in the world, with over 2 million registered users in the US and Canada.
6. ***AltaVista internation***.   Currently over half of its traffic ocmes from outside the US. To further encourage this growth, AltaVista has recently created local sites in France, Germany, Italy, the Netherlands, Sweden, and the UK.

The portal gives the website owner access to online traffic reporting through *Reporting.net site*. With reports available at any time, the owner can assess how effectively his affiliate network site is marketing AltaVista's products.

1. Search Catalogues, invetory database, auctions, classifieds, job listenings, and even suppliers.
2. Imrove the success rate of incoming searches—new linguistic query processing tools let customers find products even when they do not know exact product names or model numbers.
3. Allow users to sort results by brand, price, availability, or any method.
   With these, we can tailor the search to fulfil specific requirements. They build communities on deep and rich topics and region-specific contents. They also present search results with the help of a customized interface. Added to all these, they leverage AltaVista's global index of images, new articles, and audio and video clips.
   These create a central knowledge source to help make your enterprise more competitive. The company could link business partners, suppliers and others to the network.

Personalized Portal : *My yahoo*! As a value chain Model

My Yahoo! Is the user's own personalized version of Yahoo! After the user gives his personal information, My Yahoo! Allows him to collect all his favourite sections of Yahoo! In one place. He can choose what he wants to surf, as news, weather, stock prices, sports scores, TV and movie listings, horoscopes, and much more. It is like having a personal secretary who would collect the favourite sections of the newspapers, give information about mail and appointments for the day, and so on.

My Yahoo! Is absolutely free. To register, just click 'Get your Own My Yahoo!' on the My Yahoo! Home page and feed in your favourite sections. My Yaho is also completely portable, which means, a person can check My Yahoo! From work, home, school, a friend's house, or a cyber café. These are just some of the things that makes My Yahoo! A great home page. My Yahoo! Allows a user to have two pages—a home page, and another page. The important and frequently accessed in information may be stored here. All secondary information may be stored on the other page.

Some of the tpics that Yahoo!

- Pick your weather cities
- Track your stock quotes
- Read your choice of news
- Find local movie showtimes
- Follow your favourite sports team

Manufacturer Model

The Manufacturer or "direct model", is predicated on the power of the Web to allow a manufacturer (i.e. a company that creates a product or service) to reach buyers directly and thereby compress the distribution channel, the manufacturer model can be based on efficiency,

improved customer service, and a better understanding of customer preferences. In this model, the manufacturere sells its products throught the use of its website.

Purchase. The sale of a product in which the right of ownership is transferred to the buyer.

Lease. In exchange for a product in which the right to use the product under a "terms of use" agreement. The product is returned to the seller upon expiration or default of the lease agreemennt may include a right-of-purchase upon expiration of the lease.

Licence. The sale of a product that involves only the transfer of usage rights to the buyer, in accordance with a "terms of use" agreement. The ownership rights remain with the manufacturer. (e.g. in case of software licensing).

Branded Integrated content. In contrast to the sponsored-content approach (i.e. the advertising model), brand-integrated content is created by the manufacturer itself for the sole basis of product placement.

Tata Steel

Established in 1907 at Jamshedpur, the company is one of india's best known symbols of inductrial growth. It represents the country's single largest, integrated steel works in the private sector, with a market share of about 13 percent. The company is india's single largest exporter of high-quality, value-added stell products. It is the producer of one of the cheapest HR coils in the world. A blue-chip company, Tata Steel Ltd has successfully raised $100 million through Euro bonds.

The company offers a diverse range of products and services. These include HR / CR coils and sheets, tubes, construction bars, forging qualifity steel, rods, structureal strips and bearings, steel plant and material handling equipment, Ferro alloys and other minerals, software for process controls and cargo handling services. Sister companies offer tinplate, wires, rolls, refractories, project management services, and material handling equipment.

The company has technological and strategic tie-ups with world leaders such as thyssen, Nippon Steel, Hitachi, Posadata, and McKinsey.

E-business

Tata Steel establishes e-busines throught its website *www.tatasteel.co.in*

E-sales

Building a trusting, long lasting, and mutually beneficial relationship with their customers has been Tata Steel's fundamental belief and driving force. This hs formed the cornerstone of all their intiatives. In line with this, their latest offering is the self-help customer service.

Their site offers you a collection of reports on an online basis anywhere—anytime, easy to read directly from their SAP R/3 system. As a valued customer, you can now access information ranging from your order status to delivery status, invoices to credit notes, payment dues to credit status, and many more, through exclusively tailored reports.

E-procurement

The e-procurement site is Tata Stell's Business-to-Busines (B2B) procurement platform. Among the many forward looking initatives being undertaken by Tata Steel to tap the tremendous opportunities offered by Information Technology, especially the Web, e-procurement is one of them being used to conduct business with the suppliers.

The supliers of Tata Steel, who would become e-partners, are expected to reap lot of benefits through this sytem.

E-auction and Tenders

The Tata Iron & Steel company was founded by the visionary Indian Industrialist Jamshedji Nusserwanji Tata in 1907. Today, the company consists of steel works at Jamshedpur with its own capative colliereis (a coal mine) at Jharia and West Bokaro and ore (rock or soil from metal) mines and quarries (an artificial hole in the ground for sand) at Noamundi and Joda. It has a wide product range that includes billets, structural bars, strips, tubes and bearings, H-R coil, C-R coil, GP sheets and plates.

The secondary products profit Center focusses its attention on marketing of products which are secndary to the company's main business. It encompasses selling of steel scrap, used and rejected material, by-products, raw materials from works, under size and extra generation from their collieries, and obsolete capital equipment and spares. The division has its headquarters at Jamshedpur and the marketing office at Kolkatta.

In order to meet the customer's demand in the best possible manner, this site has been launched for Tender Information and online quoting, which is the quickest method to serve the customers.

Advertising Model

The web advertising model is an extension of the traditional media broadcast model. The broadcaster, in this case a website, provides content (usually, but not necessarily, for fee) and services (like e-mail, chat, forums), together with advertising messages in the form of banner ads. The banner ads may be the major or sole source of revenue for the broadcaster. The broadcaster may be a content creator or a distributor of content created elsewhere. The advertiseing model only works when the volume of viewer traffic is large or highly specialized.

Advertising-driven sites are currently one of the cornerstones of e-commerce. The principles is simple and well known. A site offers free access to something and shows advertisements on every page. When a user clicks on an advertisement (eyeballs) or for every time someone clicks on the advertisement (click-through).

The same idea is popular in computer programs. Users can download and use the program for free but advertisements are shown during operation or startu-up of the program. In particular, advertisements can be shown when the user needs to wait for some time consuming operation, such as printing or scanning.

It is well known that an advertisement related to the topic at hand on the site will get higher exposure and click –through since such advertisemetns are targeted to the siet visitors. So, the site operator earns more money if he places on the site such targeted advertisements. When displaying advertisements in a computer program, it is possible to targeted advertisements to the purpose of the program, e.g. a spreadsheet shows advertisements for a stock brokering services.

Search engines use this idea as well, but relate the advertisements to the keywords entered in a query. For instance, if someone searches information on hilidays, an advertisement is shown for a hotel chain on the page with search results. The advertisement can further be targeted based on the use profile for the user doing the search.

The existence of advertising-driven sites created a business opportunity for companies such as DoubleClick, which collects advertisements from many sources and arranges for placements on different sites. The sources pay DoubleClick for placing their advertisements, and this revenue is then shared with the site owners. Additionally, DoubleClick tracks the users that view all the advertisements, which allows it to build a user profile. This profile can then be used to more accurately target advertisements to these users.

Web pricing Models

1. CPM or impression only (sets cost-per-thousand of guaranteed ad views)
2. Click-through (the advertiser pays based on the number of times the banner is clicked by the user)
3. Sponsorships (package deals of impression and click-throughs)
4. Cost-per-lead (the advertiser pays when a viewer registers or submits personal information)
5. Cost-per-Sale (agreed upon charge for the viewers who actually purchase a product or service based on the ad)
6. Straight revenue sharing deals (the publisher receives a commiision which is paid upon sale from an ad)

Types of Advertising on the Internet

1. *Portals*. A search engine that may include varied conttent or services. A high volume of user traffic makes advertiseing profitable, and permits further diversification of site services. A personalized portal allows customization of the interface and content to user. Example: yahoo!
2. *Classifieds*. Lists items for sale or wanted for purchase. Listning fees are common but there also may be a membership fee. Example: Monster.com
3. *User-based paid placement*. Sells favourable link positioning (i.e. sponsored links) or advertising keyed to particular search eterms in a user query. Example: eZula.

Different Web Advertising Formulas

1. Banners. An ad appering at the top of a web page.
2. Vertical columns. On a frame web page positions alongside requested content (often as form of sponsorship).
3. Pop-up Windows. Java script opens a browser window with an ad.
4. Interstitials. Full screen ads that appear on a web browser while a page is loading.
5. Advertorials. Content-based advertising related to an article or other site contents.
6. Intermercials. Animated full-screen ads placed at entry of a site before a user reaches the intended content (CBS Market watch).
7. Ultramercials. Interactiver online ads that requrie the user to repond intermittently in order to wade through the message before reaching the intended content.

Formats that permit more effective online ads.

1. Richer ad conten through sight, sound, and motion.
2. More information (larger files)
3. More interactivity
4. Larger screen size
5. More prominent screen positions
6. Less content competition
7. Reliable measurement and reporting to enable each advertiser to determine its ad ROI—impressions, interactivity, brand sell

8. Accurate audience measurement
9. Meaningful user targeting
10. Cost-effective advertising model with rates reflecting advertiser value

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Sify.com

Sify is india's pioneer in Internet and e-commerce, and offers integrated end to end solutions with a comprehensive range of products and services, for both the Business-Consumer (B2C) and Buiness-to-Business (B2B) segments, that cover the four critical cornerstones of the Net: Connectivitiy, Content, Commerce, and Community.

Their mission is "Making the Internet Work For You."

Sify enables this through the products, services and technology that they offer in the comprehensive suite of Business-to-Business e-commerce solutions and expertise that they provide in assiciation with global leaders. They delight customers with innovative B2C solutions like Satyam Online, the instant Internet access package and *www.sify.com*, one of India's most popular portals.

Sify established the first private TCP/IP public data network between all the major cities in the country. This revolutionized business computing in india, with its interconnectivity between multi-location offices, flexibility of platforms, addplication software, and smooth transfer of data. theirs is the first frame relay service, the first ATM backbone, the first public data network with 2Mbps backbone, and the first authorized Notes public network.

Sify was the first private ISP to operate when the ISP policy was announced in 1998, pioneering this category of service with a customer focus that has made them the qualitative leader in Internet access services. They were also the first to offer Internet telephoney in April 2002, after the change in policy allowed it.

Sify is india's first and largest private Internet Service Provider. Sify pioneered the first-off-the-shelf, ready-to-use Internet connection in a tamper-proof CD Pack. Available in a wide range of usage packs, SatyamOnline today enables thousands of subscribers to benefits from the power of the Internet.

Their consumer portal *www.sify.com* aims to enhance the quality of user's lives by making them more efficient, connected, and aware of the world around them. The portal has many pioneering initiatives with regard to shopping, managing one's financial portfolio and brand promosions, in addition to mail, messaging, and search.

As sify, their objective is to be a one-step, e-solutions shop with a range of innovative and cost-effective IT solutions, products, and services. That is why they hve formed alliances with leaders in e-commerce, Internet commerce, and network solutions. And they are strategically poised to give their clientele the best there is .

Sify's customer care processes are ISO 9002 certified—the first and only national Internet Service Provider to have such a certification.

So, at sify, you'll find Customer Care Centers across the country, providing anytime, anywhere support. These 24-hours Centers have dedicated teams of tranied customer care executive who address and diagnose all queries and problems related to SatyamOnline Internet access, swiftly and accurately.

In theirpursuit towards making organizations and the economy Internet driven, they are allied with those providing IT solutions, sales partners of our Internet-based products and services, Web-based solution providers including website designers and web hosting service providers, and online content providers.

Subscription Model

Usera are charged a periodic—dily, monthyl, or annual-fee to subscribe to a service. It is not uncommon for sites to combine free content with "preminum" (i.e subscriber or member-only) content. Subscription fees are incurred irrespective of actual usage rates subscription and advertising models are frequently combined.

Content services provide text, audio, or video content to users who subscribe for a fee to gain accessto the service. Example: Netflix.com

Person-to-person Networking Services are conduits for the discribution of user-submitted

information, such as individuals searching for former schoolmates. Example:
Classmates.com code of conduct, and in which members pay asubscription fee. Example:
Truste.com montyly subscription.

Internet Services Providers offer network connectivity and related services on a montyly subscription. Example: America Online.The organization makes money on the basis of membership / subscription.

Some popular topics of subscription model are
- o Existing newsletter topics
- o Trade associations.

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eGrucool.com

NIIT's vast experience in the field of educaion and eGurucool's expertise and in depth understanding of the curricula have come together to make this a good site for e-eduction. Students are assured of a holistic learning experience that ensures a rewarding performance in school and board examinations, apart from the building up of a strong concepturla foundationfor later life.

The salient features and benefits of the eGrucool way of learning are:

- Weel structured lesson plans that generate interest, curiosity, and provide clarity about the objectives that sould be achieved through the lessons. This ensures that students are drawn towards the lesson and derive maximum benefit from it.

- The lesson is not overloading, and is administered step-by-step. It is build textual. It incorporates the attributes of a very good teacher who asks, stimulates, prods, cajoles, and ispires.

- Technology is used wherever necessary—not to dazzle or distract but to provide greater insight through interactivity—without distrupting the flow of the lesson.

Courses offered

An array of courses from eGrucool for students and teachers, course help and test preparation modules plus value-added services that enhance the qualitiy of education.

- CBSE Programs
- ICSE Programs

- Maharashtra Board Programs
- IIT JEE Programs

eConnect

This is a service that empowers schools by connecting students, teachers and parents 24 hours a day and 7 days a week! It includes creation and maintenance of school websites, onlie classnotes and assitgnments, and performance tracking. Through eConnect, eGrucool has tie-ups with over 1600 schools across the country and is here to change the way schools look at education.

Course Structure

The program is designed to cover the entire syllabus prescribed for a class:

- The theory and concepts of each chapter are covered in detail in the class, illustravtive examples are used to reinforce concepts.
- Regular assignements and tests with 'ideal' solutions.
- Mid-course assessment is done through a set of section tests.
- A set of full length tests that closely simulate the board pattern. A minimum of 7 tests.
- In addition to lectures, students also get printed booklets as study material.

E-Services

This is a web-based service that connects students, teachers and parents round-the-clock, 7 days a week. It allows student to access classnotes and assignements prepared by teachers and track their academic performance. Besides, eConnect provides an online marking tool for multiple choice questions.

Within an year of its launch, the eConnect offers:
1. **eAssignments**. Homework gets exciting. eAssignemtns give students access to their assignemetns wherver they are.
2. **eClassnotes.** Notes are just a click away. eClassnotes provide value-based synopsis and insight into the forthcoming topics.
3. **Online MCQ test.** Allows students to take MCQ tests online and gauge their performance instantly.
4. **Performance tracker.** This allows studetns and their parents to access their performance graphs.
5. **Online Quizzes.** Subject and chapter-specific quezzes are available for all students from Class IX to Class XII.

eAssignments

eAssignements allow teachers to put up their assignemtns for the class on eht web. So studetns can access it anytime….wherever there is a computer. This makes learning exciging, and helps students learni beyond the confines of their classrooms.
In short, eAssignments are an extension of value added information that teachers provide in classrooms. It increases pace of learning, integrates concept learning and test preparation, and undoubtedly gives a better forum for discussion.
eAssignemtns are supported by onjective type questions which the students can answer online and get an instant evaluation. The subjective assignments can be submitted online or in class.

Benefits for students
- Assignments provide theoretical and conceptual clarity.
- Assingments integrate concept understanding and test preprataion.
- Assignments facilitate avenues for self-assessment by providing instant evaluation of objective questions.

Benefits for teachers
- Assingments facilitate effective classroom discussions.
- Assignments allow closer interaction among the teachers and students.
- Automatted checking of objective questions saves time.

Benefits for Parents
- Makes it easy for their wards to access reference material.
- Objectives and subjective questions provide easy testing facility at home.
- Parents can keep tracking of what is taught in the class and also follow up on their ward's performance.

eClassnotes

eClassnotes are a compilation of notes. A value-based synopsis, eClassnotes also offer students an insight into the forthcoming topics. The notes are also archived to facilitate revision. Prepared by school teachers, these notes are password protected and can be accessed at a convenient time.

eClassnotes provide an extension of value added information that teachers give in classrooms. It increases the pace of learning, integrates concept understanding and test preparation, and undoubtedly provides a better forum for discussions tna interaction amonges teachers and students.

Online MCQ Test

This allows student to take MCQ test online. Not only this, an automated in-buil tool does an instant evaluation. Students get a fair idea of their preparation as both the questions and the answers are provided by their school teachers.

An extension of value added information that teachers provide in classrooms, MCQ tests provide ease of accessibility, besides incoreasing the pace of learning while integrating concept internatlization and test preparation.

Performance Tracker

An automated, user-friendly and efficient online systm, the performance tracker keeps track of a student's academic perfmance througout the year.

It generates descriptive report cards—class, student, test and subject-wise—and provides information on a student's individual performance. Besides, it provides a comparative analysis vis-à-vis the class for all the exams and class test conducted in a year. The performance tracker archives all the marks saved.

Moreover, teachers are saved from all the labourious calculations that are associated with the preparation of report cards. The teacher simply has to login and feed in the marks for every exam and test conducted. The in-built tool in the performance tracker automatically makes new calculations for grand total, aggregate percentage, and class average, and accordingly updates the report card. While making calculations, it even takes into account the weightage

awarded to class test and term-exams. Teachers can subsequently take printouts of the results for reference and qualititive feedback to the parents.

Performance trakcer, being online, can be referred to without the constraints of time. Separate login IDs are provided to teachers, students and parents to access the same.

Course activation

Course activation is a one-time process. Once you have activated your course, you can access it straightway from the 'My Account' area.

Enter the order number and course code for the course given in your strater kit. Enter course activation pin and the click SUBMIT button.

Affiliate Model

In contrast to the generalized portal, which seeks to drive a high volume of traffic to one site, the affiliate mode provides purchase opportunities wherever prople may be surfing. It does this by offering finantial incentives (in the form of a percentage of of revenue) to affiliated partner sites. The affiliates provide purchase-point click-through to the merchant. It is a pay-for-performance model—if an affiliate does not generate sales, it represents no cost to the merahcnt. The affiliate model is unherently well-suited to the Web, which explains its popularity. Variations include banner exchange, pay-per-click, and revenue-sharing programs.

Banner exchange. it trades banner placement among a network of affiliated sites.

Pay-per-click. It offers a percent-of-scale commission based on a user click-through in which the user subsequently purchases a product.

The affiliate saves the expense of handling inventory, advertising and promoting the produt, and processing the transaction. In fact, the affiliate risks no funds whatever. *Cdnow.com* and *amazon.com* were two of the first companies to create successful affiliate programs on the web. CDnow's Web Buy program, which includes more than 250,000 affiliates, is one of CDnow's main sources for new customers. The amazon.com program has over 4000,000 affiliate sites. Most of these affiliate sites are devoted to a specific issue, hobby, or other interest. Affiliate sites choose books or other items that are related to their visitor's interests and include links to the seller's site on their Web pages.

Books and CDs are natural for this type of shared promotional activity, but sellers of other products and services also have successful affiliate marketing programs. One of the more interesting marketing tactics made possible by the Web is cause marketing, which is an affiliate marketing program that benefits a charitable organization (and, thus, supports a "cause").

In cause marketing, the affiliate site is created to benefit the charitable organizaion. When visitors click a link on the affiliate's web page, a donation is made by a sponsoring company. The page that loads after the visitor clicks the donation link, carries advertising for the sponsoring companies. Many companies have foind that the click-through rates on these ads are much higher than the typical banner ad click-through rates.

A leading retail Web florist, *proflowers.com*, has had excellent results advertising on the *Hunger site page*. When a visitor clicks the button on this page, a group of sponsoring advertisers donates food to a hungry person a page appears in the visitor's browser with ads for the sponsors.

History of E-Commerce and Indian Business Context

When the technology bubble burst in 2000, the crazy valuations for online companies vanished with it, and many businesses folded up. The survivors plugged on as best they could, encouraged by the growing number of Internet Users. Now valuations are rising again and some of the dotcoms are making real profits, but the business would has become much more Watchful about the Internet's potential. An surprising thing is that the wild reasoning about future was made the height of the explosion, namely that vast chunks of the world economy would move into cyberspace, are in one way or the other coming true.

According to America's department of commerce, online retail sales in the US market in 2007 was about 130 billion. But the commerce dapartment's figures deal with only part of the retail industry. For instance, they exclude online travel services, financial services, ticket sales agencies, (a$2 billion business in America in 2003), online dating and a host of other activities, from tracing founders to gambling (worth perhaps $6 billion worldwide).

The commerce department's figures include the fees earned by internet auction sites, but not the value of goods that are sold an surprisingly $7 billion worth of trade was done in 2006 one *e-Bay*, nor by definition, do they include the billions of dollars worth of goods bought and sold by businesses connecting to each other over the internet. Some of these *B2B services* are proprietary for example, *WalMart* tells its suppliers that they must use its own system if they want to be part of its annual turnover of $350 billiion.

The interent is profoundly changing consumer behaviour. One in five customers waling into a dry department store in America to buy an electrical appliance will have researched their purchase online—and most will know down to a dime (a US Coin) what they intend to pay. More surprisingly, three out of four Ameriancs start shopping for new cars online, even though most end up buying them from traditional dealers.

The difference is that these customers come to the showroom armed with information about the car and the best available deals, sometimes they even have computer printouts identifying the particular vehicle from the dealer's stock that they want to buy.

People seem to enjoy shopping on the internet, if high customer-satisfaction scores are any guide. Websites are doing ever more and cleverer things to serve and entertain their customers, and seem set to take a much bigger share of people's overall spending in the future. This has enormous implications for business.

A company that neglects its website may be committing commercial suicide. A website suggests a useless company, and arival is only a mouse-click away. But even the coolest website will be lost in cyberspace if people cannot find it, so companies have to ensure that they appear high up in internet search results.

The other way to get noticed online is to offer goods and services through one of the big sites that already get a lot of traffic. *Ebay, Yahoo*! And *Amazon* are becoming huge trading platrofms for other companies. But to take part, a company's products have to stand up to intense price competition.

People check online prices, compare them with those in their local high street and may well take a peek at what customers in other countries are paying. Even if websites are prevented from shipping their goods abroad, there are plenty of web based enterpreneurs ready to oblige.

Early Business Information Interchange Efforts

The Emergence of large business organizations in the late 1800's and early 1900's triggered the need to create and maintain formal records of business transactions. In the 1950s, companies began to use computers to store and process internal transaction records, but the information flows between businesses continued to be on paper, Purchase orders, invoices, bills of lading, cheques, remittance advices, and other standard forms were used to document transactions.

The process of using a person or a computer to generate a paper form, mailing that form, and then having another person enter the data into the trading partner's computer was slow, inefficient, expensive, redundant, and unreliable, by the 1960s, businesses that engaged in large volumes of transactions had begun exchanging transaction information on punched cards or magnetic tape. Advances in data communications technology eventually allowed trading partners to transfer data over telephone lines instead of shipping punched cards or magnetic tapes to each other.

Although these information transfer agreements between trading partners increased efficiency and reduced errors, they were not an ideal solution. Since the translation programs that one trading partner wrote usually would not work for other trading partners, each company participating in this information exchange had to make a substantial investment in computing infrastructure. Only large trading partners could afford this investment, and even those companies had to have a signinificant number of transactions to justify the cost. Smaller or lower volume trading partners could not afford to participate in the benefits of these paper-free exchanges.

In 1968, a number of freight and shipping companies joined together to form the *Transportation Data Coordinating Commiittee* (TDCC), which was charged with exploring ways to reduce the paperwork burden that shippers and carriers faced, the TDCC created a standarized information set that included all the data elements that shippers commonly included in bills of lading, freight invoices, shipping manifests, and other paper forms. Instead of printing a paper form, shippers could transrorm information about shipments into a computer file that conformed to the TDCC standard format. The shipper could electronically transmit that computer file to any freight company that had adopted the TDCC format. The freight company translated the TDCC format into data it could use its own information systems, the savings from not printing and haldling forms, not entering the data twice, and not having to worry about error-correction procedures, were significant for most shippers and freight carriers.

After a decade of fragmented attempts ar setting broader EDI standards, a number of industry groups and several large companies decided to make a major efforts to create a set of cross-industry standards for electronic components, mechanical equipment, and other widely used items. The *American national standards Institute* (ANSI) has been the coordinating body for standards in the United States since 1918. ANSI does not set standards, though it creates procedures and organizational standards for the development of national standards and accredites committees that follow those procedures.

In 1979, ANSI chartered a new committee to develop uniform EDI standards. This committee is called the *Accredited Standards Committee* (ASC X12). The committee meets three times a year to develop and maintain EDI standards. The committee and its subcommittees include information technology professionals from over 800 business and other organizations. Membership is open to organizations and individuals who have an interest in the standards. The ASC X12 standard has benefitted from the participation of members from a wide variety of industries. This standard currently indludes specification for sevel hundred transation sets, which are the names of the formats for specific business data interchanges.

In 1987, the United Nations published its first standards under the title EDI for Administration, Commerce, and Transport (EDIFACT, or UN/EDIFACT). As the internet gained a chance as a tool for conducting business, the trading partners who had been using EDI began to view the internet as a potential replacement for the expensive leased lines and dial-up connections they had been using. Companies that were unable to afford EDI began to look at the internet as an enabling technology that might get them back

in the game of selling to a large number of customers who demanded EDI capabilities of their suppliers.

The major hurdles or expected obstacles to conducting EDI over the internet initially were general concerns about security and the intern's general inability to provide audit logs and third-party verification of message transmission and delivery, the lack of third-party verification continues to be an issue, since the internet has not built-in facility for that,

because EDI trnasactions are business contracts and often involve large amounts of money, the issue of non-repudiation causes significant concern.

Emergence of the Internet:

The role of the internet in the evolution of e-commerce has been so cruicial or has highest priority that the history of e-commerce will remain incomplete without the inclusion of the history of the internet.

Using the internet, read Online Versions of Newspapers, Magazines, Academic Journals, and Books, join Discussion Groups on almost any Conceivable Ttopic, Participate in Games and Simulations, and obtain free computer Software. In recent years, the internet has allowed Commercial Enterprises to connect with one another and with customers.

Today, all kinds of businesses provide information about their products and services on the internet. Many of these businesses use the internet to market and sell their products and services. The part of the internet known as the world wide web, or more simply, the web is a subset of the computers on the internet that are connected to each other in a specific way that makes those computers and their contents easily accessible to each other.

The most important thing about the web is that it includes an easy to use standard interface. This interface makes it possible for people who are not computer experts to use the world wide web to access a variety of internet resources.

In the early 1960s, the US *Department of Defense*(DoD) became very much concerned about the possible effects of a *nuclear attack* on its computing facilities. The Defense Department realized the need for powerful computers for coordincation and control. The powerful computers of that time were all large mainframe computers. So the Defense Department began examining ways to connect these computers to each other and also to weapon installations that new distributed all over the world.

The Defense Department agency, charged with this task, hired many of the best communications technology researchers and funded research at leading universities and institutes to explore the task of creating a worldwide network that could remain operational even if parts of the network were destroyed by enemy military action or demolition.

These reaserchers worked to arrange ways to build networks that could operate independently–that is, networks that would not require a central computer to control network operations.

The world's telephone companies were the early models for networked computers, because early networks of computers used leased telephone company lines for their connections. Telephone company systems of that time established a single connection between sender and receiver for each telephone call, and that connection carried all the data along a single path. When a company wanted to connect computers it owned at two different locations, it placed a telephone call to establish the connection and then connected one computer to each end of that single connection.

The Defense Department was concerned about the inherent risk of this single-channel method for connecting computers. So its researchers developed a different method of sending information through multiple channels, in this method, files and messages are broken into packets and labelled electronically with codes about their origin and destination. The packets travel from computer to computer along the network until they reach their destination. The destination computer collects the packets and reassembles the original data from the pieces in each packet. Each computer that an individual packet encounters on its trip through the network, determines the best way to move the packet forward to its destination.

In 1969, these Defense Department researchers used this network model to connect four computers—one each at the *University of California* at *Los Angeles*, SRI International, the *Univerisity of California* at *Santa Barbara*, and the *University of Utah*. During the subsequent years, many researchers in the academic community connected to this network and contributed to technological developments that increased the speed and efficiency with which

the network operated. At the same time, researchers at other universitites were creating their own networks using similar technologies.

The upshot was the *Internet Protocol* (IP), which enabled any number of computer networks to link up and act as one—and eventually it was given the name, the Internet. This meant that the communication network among the computers was not dependent on any single computer to operate, and so could not be shut down by destroying one or even several of the computers. Thus, the Defense Department got what it wanted. And a new, growing system of computer networks was created.

Although the goals of the Defense Department network were still to control Defense systems and transfer researche files, other uses of this vast network began to appear in the early 1970s. in 1972, a researcher wrote a program that could send and receive messages over the network. Thus was born the e-mail which came to be widely used very quickely.

The number of network users in the military and education research communities continued to grow, Many of these new participants used to netowking technology to transfer files and access remote computers. The network software included two tools for performing these tasks. *File Transfer Protocol* (FTP) enabled users to transfer files between computers, and *Telnet* let users log on to their computer accounts from remote sites. Both FTP and Telnet are still widely used on the Internet for file transfers and remote logins, even though more advanced techniques are now available that allow multimedia transmissions such as real-time audio and video clips.

The first e-Mail mailing lists also appeared on these networks. In 1979, a group of students and programmers at the *Duke University* and the *University of North Carolina* started *Usenet*, an abbreviation for *User News Network*, Usenet allows anyone who connects the network to read and post articles on a variety of subjects.

The Defense Department's networking software became more widely used as academic and research institutes realized the benefits of having a common communications network. The explosion of personal computer use during that time also helped more people become comfortable with computing. In the late 1980s. these independent academic and research networks merged into one infrastructure—the Internet that links today hundreds and thousands of networks to one another.

Commercial Use of Internet

As personal computer became more powerful, affordable, and available during the 1980s, companies increasingly used them to construct their own internal networks. Although these networks included E-mail software theat enabled the employees to send messages, businesses wanted their employees to be able to communicate with people outside their corporate networks for promoting business. The Defense Department network and most of the other academic networks that had teamed up with it were receiving funding from the National Science Foundation (NSF). The NSF Prohibited Commercial Network traffic on its networks and so businesses turned to commercial e-mail services providers to handle their e-mail needs larger firms built their own networks that used leased telephone lines to connect field offices to corporate headquarters.

In 1989, the NSF permitted two commercial e-mailservices, MCI Mail and CompuServ to establish limited connections to the internet for the sole purpose of exchangeing e-mail transmissions with users of the internet.

These connections allowed commercial enterprises to send e-mail directly to internet addresses and allowed members of the research and education communities on the Internet to send e-mail directly to MCI Mail and CompuServ addresses. The NSF Justified this limited commercial use of the Internet as a service that would primarily benefit the Internet's non-commercial users.

Growth of the Internet

In 1991, the NSF further eased its restrictions on Internet commercial activity and began implementing plans to privatize the Internet.

The Privatization of the Internet was substantially completed in 1995, when the NSF turned over the operations of the main Internet Connections to group of privately owned companies. The new structure of the Internet was based on four Network Access Points (NAPs), each operated by a separte company. These companies, which are known as network-access providers, sell Internet access rights directly to large customers and indirectly to smaller firms through other companies, called Internet Service Providers (ISPs).

The Internet was a phenomenon that truly sneaked into an unsuspecting world. The researchers who had been so involved in the creation and growth of the Internet just accepted it as a part of their working environment, people outside the research community were largely unaware of the potential offered by a large interconnected set of computer networks.

Within 30 years, the Internet became one of the most amazing technological and social accomplishments of the 20th century. Millions of people are using today this complex, interconnected newtork of computers.

These computers run thousands of different software packages. The computers are located in almost every country of the world. Every year, billions of dollars change hands over the Internet in exchange for all kinds of products and services. All of this activity occurs with no central coordination point or control, which is especially interesting, given that the Internet began a way for the military to maintain control while under attack.

The opening of the Internet to business activities helped increase the Internt's growth dramatically, however, there was another development that worked hand in hand with the commercialization of the Internet to spur its growth. That development was the World Wide Web(WWW).

Emergence of the World Wide Web

The web is more a way thinking about and organizing information storage and retrieval than a technology. As such, its hisptory goes back tomany years. Two important innovations played key roles in making the Internet Easier to use and more accessible to people who were not research scientists. These two innovations were Hypertext and Graphical User Interfaces (GUIs).

Origins of the Web

In 1945, Vannevar Bush, who was director of the US Office of Scientific Research and Development (R&D), wrote an Atlantic Monthly Article about ways that scientist could apply the skills they learned during World War-II to peacetime activities. The article included a number of visionary ideas about future uses of technology to organize and facilitate efficient access to information. Bush speculated that engineers would eventually build a machine that he called the *Memex* (a memory extension device), that would store all—a Persons's Books, Records, Letters, and research results—on microfilm. Vannevar Bush described a system for associatively linking information in his July 1945 article in The Atlantic Monthly, '*As We May Think*'[2].

Hypertext, as implemented on the Web, however, has its origins in the start of the electronic computer age, when ideas about associative linking could be married with the possibilities of automated storage-and-retrieval systems. *Douglas Engelbart*, who also invented the computer mouse, created the first experimental hypertext system on one of the larges computers of the

1960s. in 1965, *Ted Nelson* coined the term hypertext to describe a text that is not contrained to be sequential.

Hypertext, as described by Nelson, links documents to form a web of relationships that draws on the possibilities for extending and augmenting the meaning of a 'flat' piece of text with links to other texts, Hypertext terefore is more than just footnotes that serve as commentary or further information in a text.

Istead, it extends the structure of ideas by making 'chunks' of ideas available for inclusion in many parts of multiple texts, Nelson also coined the term hypermedia, which is a hypertext not constrained to be text, it can include the combination of text, pictures, graphics, sound, and movies.

The ideas of vannevar Bush, Ted Nelson and others, about information systems, showed up in another project in the late 1980s. In March 1989, Tim Berners-Lee, a researcher at the Conseil Europeen Pour la Recherche Nucleaire (CERN), the European Laboratory for Particle Physics in Geneva, Switzerland, Proposed a Hypertext system to enable efficient information sharing for members of the higher-energy physics community. This proposal, called HyperText and CERN, was circulated for comments. The important components of the proposal follow;

- A user interface that would be consistent with all plateforms and that would allow users to access information from many different computers.
- A scheme for this interface to access a variety of document types and information protocols.
- A provision for universal access, which would allow any user on the network to access any information.

In October of 1991, a gateway from the web to Wide Area Information Server (WAIS) software was completed. On 15 January 1991, the WWW interface became publicly available from CERN, and the CERN team demonstrated the Web to researchers internationally throughout the rest of the year.

By 1993, there were about 50 Web Servers in existence, and the first graphical interfaces (Called Clients or browsers) for the X window system and the Machintosh became available in Switzerland. Until 1993, most of the development of Web technologies came out CERN. In earyly 1993, however, a young undergraduate, Marc Andreessen, at the University of Illinois at Urbana-Champaign shifted the stage to the United States.

Working on a project for the National Center for Supercomupting APlications (NCSA), Andreessen led a team that developed an X Window System Browser for the Web and Called it Mosiac. Marc Andreessen and his colleagues then left NCSA in March 1994 to form a company that later came to be known as NEtsape Communications Corporation. By May 1994, the interest in the Web was so intense that the first internation conference on the WWW, held in Geneva, overflowed with attendees.

By mid 1994, it was clear to the original developers at CERN that the stable development of the web should fall under the guidance of an internation organization. In July, the Massaechusetts Insititute of Technology (MIT) and CERN announced the World Wide Web Organization (which was later known as the World Wide Consortium, or W3C). Today, the W3C guides the technical development and standards for the evolution of the Web.

In 1995, the web development was marked by rapid commercialization and technical change, Netscape Communication's browser, called Netscape Navigator (nicknamed Mozilla) contined to include more extension s of the Hypertext Markup Language (HTML), and at the same time the issues of security for commercial cash transactions garnered much attension. By May 1995, there were more than 15,000 known public Web servers—a ten-fold increase over the number that existed only a year before.

Hypertext Transfer Progocol (HTTP) is the Internet Protocol responsible for transferring and displaying web pages. HTTP runs in the application layer of the Transmission Control Protocol/Internet Procotol (TCP/IP) model. Like the other Internet Protocols, HTTP employs the client-server model in which a user's web browser opens a HTTP session and sends a request to remote server for a Web Page. In repsonse, the server creates an HTTP response

message that is sent back to the user's Web browser. After the client determines that the message it received is correct, the TCP/IP connection is closed and the HTTP session ends. The Process demonstrated in following figure.
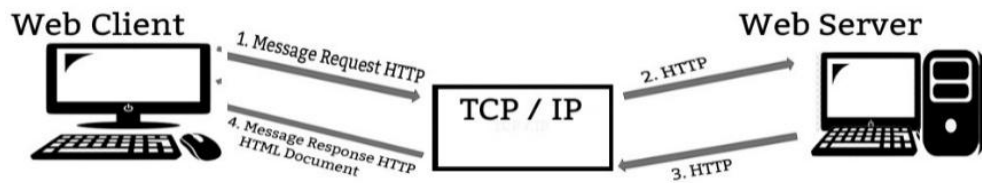
Figure 1.15 : Client-Server Architecture Using HTTP

The Milestones

1988	-- The number of hosts on the net became over 60,000.
1989	-- Over 10,000 hosts on the net were registered.
1991	-- The World Wide Web (WWW) was created by CERN in Switzerland.
1992	-- One million hosts on the net were found.
1993	-- The InterNIc is created to handle domain name registration.
1995	-- There were a total of 6.6 million hosts or computers on the Internet.
July 1996	-- An estimated 12.8 million hosts, 212,155 websites and about 25 million users of the web. About 90%of the users of the web are in the United States.
July 1997	-- 1.3 million domain names registered.
December 1997	-- 22 million servers, 40 million users on the WWW.
2000	-- 110 million users and 72 million domains names.
2003	-- 802.2 million users 233 million hosts.
2004	-- 817 million
2005	-- 1018 million users.
2006	-- 1093 million users.
2007	-- 1350 million users.

The number of World Wide Web users continues to double in size about every 12 to 15 months. All of these have had an impact. Perhaps the most significant factor, though, is that the internet offers a range of messaging techniques, all of which work rapidly.

The standards used to make it work are not all ratified by international standards bodies, but they do work. The factor of not having to wait for standards to be agreed has surely accelerated the growth in the number of internet users.

An equally significant factor is that, with the existing level of awareness of e-commerce practices, companies can easily identify the internet as a means of exchanging business data. The growth of websites over the years[4] is shown below.

Year	Number of hosts advertised in the DNS		
1993	1,313,000	1994	2,2,17,000
1995	4,852,000		
1996	9,472,000		
1997	16,146,000		

1998	29,670,000
1999	43,230,000
2000	72,398,092
2001	109,574,429
2002	147,344,723
2003	171,638,297
2004	317, 6464,084
2005	353,284,187
2006	394,991,609
2007	433,193,199
2008	500,000,000
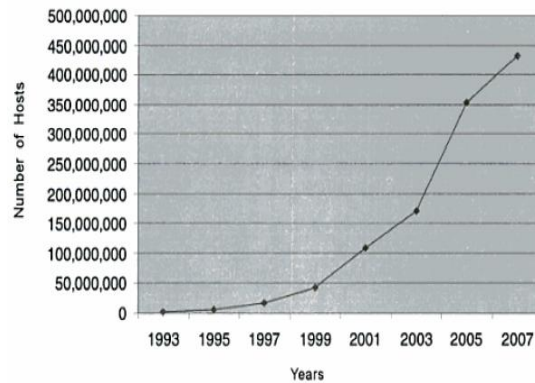
Figure 1.16 : Growth in the number of internet hosts over the years.

Advantages of E-commerce

Some of the strengths of using the Internet for businesses include the following:

1. ***24 x 7 Operation.*** Round-the-clock operation is an expensive proposition in the 'brick-and-mortar' world, while it is natural in the 'click-and-conquer' world.
2. ***Global reach.*** The net being inherently global, reaching global customers is relatively easy on the net compared to the world of bricks.
3. ***Cost of acquiring***, serving and retaining customers. It is relatively cheaper to acquire new customers over the net; thanks to 24 x 7 operation and its global reach.
   Through innovative tools of 'push' technology, it is also possible to retain customers' loyalty with minimal investments.
4. ***An extended enterprise is easy to build.*** In today's world every enterprise is part of the 'connected economy'; as such, you need to extend your enterprise all the way to your suppliers and business partners like distributors, retailers and ultimately your end-customers. The Internet provides an effective (often less expensive) way to extend your enterprise beyond the narrow confines of your own organization. Tools like enterprise resource planning (ERP), supply chain management (SCM) and customer relationship management (CRM), can easily be deployed over the Internet, permitting amazing efficiency in time needed to market, customer loyalty, on-time delivery and eventually profitability.
5. ***Disintermediation.*** Using the Internet, one can directly approach the customers and suppliers, cutting down on the number of levels and in the process, cutting down the costs.
6. ***Improved customer service to your clients.*** It results in higher satisfaction and more sales.
7. ***Power to provide the 'best of both the worlds'.*** It benefits the traditional business side-by-side with the Internet tools.
8. ***A technology-based customer interface.*** In a brick-and mortar business, customers conduct transactions either face-to-face or over the phone with store clerks, account managers, or other individuals, In contrast, the customer interface in the electronic environment is a 'screen-to-face' interaction. This includes PC-based monitors, ATM machines, PDAs, or other electronic devices such as the DoCopMo iMode in Japan and the Nokia 7100 in Europe. Operationally, these types of interfaces place an enormous responsibility on the organization to capture and represent the customer experience because there is often no opportunity for direct human intervention during the encounter. If the interface is designed correctly, the customer will have no need for a simultaneous or follow-up phone conversation. Thus, the 'screen-to-customer' interface has the potential to both increase sales and decrease costs. In fact, a number of innovators are entering the e-commerce markets with solutions that reintroduce humans into the process, such as the

service representatives available on demand for Web users at *www.liveperson.com* when the interface does not work, not only is the revenue lost but the organization also incurs the technology costs. Thus, a poorly designed customer interface has both negative revenue and cost implications.

9. ***The customer controls the interaction.*** At most websites, the customer is in control during screen-to-face interaction, in that the web largely employs a 'self-service' model for managing commerce or community-based interaction. The customer controls the search process, the time spent on various sites, the degree of price / product comparison, the people with whom he or she comes in contact, and the decision to buy.

    In a face-to-face interchange, the control can rest with either the buyer / seller or the community member. At a minimum, the seller attempts to influence the buying process by directing the potential buyer to different products or locations in the store, overcoming price objections and reacting in real item to competitive offering.

    The virtual store can attempt to shape the customer experience with uniquely targeted promotions, reconfiguration of storefronts to reflect past search behaviour, recommendations based on previous behaviour of other similar users, and access to proprietary information. However, the seller has much less power in the online environment due to the control and information flows that the online world puts in customer's hands.

10. ***Knowledge of customer behaviour.*** While the customer controls the interaction, the firm has unprecedented access to observe and track individual consumer behaviour companies, through a third-party measurement firm such as Vividence and Accrue, can track a host of behaviours on websites visited, length of stays on a site, page views on a site, contents of wish lists and shopping carts, purchases, dollar amounts of purchases, repeat purchases behaviour, conversion rates of visitors who have completed transactions and other metrics.

    This level of customer behaviour tracking, in contrast with tracking consumer attitudes, knowledge or behavioural intensions, is not possible in the brick-and-mortar world. Armed with this information, companies can provide one-to-one customization of their offerings.

    In addition, companies can dynamically publish their storefronts on the web to configure offerings to individual customers. In a tactical embellishment, electronic retailers can welcome a user back by name. In more strategic terms, an online business can actually position offers and merchandise in ways that uniquely appeal to specific customers.

11. ***Network economics.*** In information intensive industries, a key competitive battleground centers on the emergence of industry-standard products, services, components, and or architecture. Network effects, as described by Metcalf's law, can best be expressed as the situation where the value of a product or service rises as a function of the number of other users who are using the product.

    A classic example is the fax machine of other people who adopt the technology. A key characteristic of network's economic is positive feedback, that is, as the installed base grows, more and more users are likely to adopt the technology because of the installed base.

    Many commercial wares in the digital economy revolve around setting a standard, growing the installed base and attempting to 'lock-in' customers to the standard because of rising switching costs. This applies to both hardware (e.g. cable modems versus DSL lines) and software (e.g. MP3 versus streaming audio).

    A key result of network effects and positive feedback is 'increasing return' economies as compared to the traditional decreasing-returns model often associated with the brick-and-mortar world. It also means that the traditional realities of marketing such as the importance of world-of-mouth (WOM) among potential customers, become greatly magnified in this new environment.

    It is this turbocharged WOM phenomenon that makes viral marketing a reality for consumer-oriented e-commerce business such as ICQ in instant messaging system.

Disadvantages of E-commerce

Some business processes may never lend themselves to electronic commerce, For example, perishable foods, and higher-cost items (such as jewelry, antiques, and the like), may be difficult to inspect from a remote location, regardless of any technologies that might be devised in the future.

Most of the disadvantages of electronic commerce today, however, stem from the newness and rapidly developing pace of the underlying technologies. These disadvantages will disappear as e-commerce matures and becomes more and more available to and gets accepted by the general population. Many products and services require a critical mass of potential buyers who are well-equipped and willing to buy through the internet.

Business often calculate the return-on-investment before committing to any new technology. This has been difficult to do with e-commerce, since the costs and benefits have been hard to quantify.

Costs, which are a function of technology, can change dramatically even during short-lived e-commerce implementation projects, because the underlying technologies are changing rapidly. Many firms have had trouble in recruiting and retaining employees with technological, design, and business process skills needed to create an effective e-commerce atmosphere.

Another problem facing firms that want to do business on the internet is the difficulty of integrating existing databases and transaction-processing software designed for traditional commerce into a software that enables e-commerce.

In addition to technology and software issues, many businesses face cultural and legal obstacles in conducting e-commerce. Some consumers are still somewhat fearful of sending their credit card numbers over the internet. Other consumers are simply resistant to changed and are uncomfortable viewing merchandise on a computer screen rather that in person.

The legal environment in which e-commerce is conducted is full of unclear and conflicting laws. In many cases, government regulators have not kept up with the trends in technologies.

Online Extension of a BAM Model

Since most conventional brick-and-mortar (BAM) organizations have established processes, people, structures and supply chains, they can become strong competitors to the dot-coms (that have no offline presence) by e-enabling their supply chains. Most BAM organizations will gain competitive advantage by creating more value for the customers at the same cost or delivering the same goods at a lower cost by using the Internet, For example, an automobile manufacturer can pass on the cost savings achieved by e-procurement, a bank can reduce the need for physical branches by making use of e-banking.

So leveraging the supply chain by making use of information, relationships, and commerce and squeezing out more value out of it would enable BAM organizations to have a level of efficiency, unparalleled by pure dotcoms, besides, dot coms without any offline presence would have to set up their supply chains from scratch. In this respect, they are greatly disadvantaged in comparison to their offline counterparts.

Transition to E-commerce in India

The potential for e-commerce is enormous in India, owing to the rapid growth of the number of Internet users. The enormous savings in time and money achieved by both buyers and sellers is the principal advantage.

Indian Readiness for E-Commerce

A pertinent question arises here about the readiness of Indian buyers for e-commerce. The proliferation of the Net at a rapid pace and the granting of private ISP Licenses has put the market *en route* to a new phase. Even small and medium enterprises (SMEs) have been increasingly realizing the potential of the net.

The technological advancements happening in all spheres of life in India will be the driving factors for the spread of e-commerce in this country, as has happened elsewhere in the world. NASSCOM (National Association of Software and Service Companies), has recently released the findings of its survey to evaluate the e-commerce scenario in India. E-commerce is dependent to a great extent, on the number of internet users in India. The following tables give the rate of growth of internet users in India.

GROWTH OF INTERNET IN INDIA

Year	Internet Subscribers	Internet Users
1997	25	45
1998	150	200
1999	359	1000
2000	650	2000
2001	1130	6668
2002	1763	10684
2003	3661	29000
2004	4403	31723
2005	6000	35000
2006	25000	37000

The Internet and India

The Internet has undergone a steady evolution from being a source of instant communication in the early 90s to a rich source of internment and education. This evolution has been driven by the growing customer expectations with the content of Internet. Thus newer segments of Internet usage have emerged and there lie potential user segments that are still unexplored and may emerge in the future.

Five years ago there was limited Internet access but only in a few major cities, all in the hands of the government, VSNL, the agency responsible for Internet activities, and the DOT (Department of Telecommunications) provided an agonizingly erratic connectivity, with miserly bandwidth and far too few phone lines. Connection rates ran as low as 5% and users were frequently cut off. And the rates for this pathetic level of service were among the highest in the world. By the end of 1998, after three years of government monopoly, there were barely 150,000 Internet connections in India.

Presently, the government monopoly is largely over. Dozens of small to large ISPs have set up shop, triggering a price war and an improvement of service. Users are now estimated at over 37 million, with a growth predicted to reach more than 50 million in the next three years.

According to the Nasscom survey, the total volume of e-commerce transactions in India was about Rs 450 crores in 1999-2000. Out of this volume, about Rs 50 crores were

contributed by retail internet or Business-to-Consumer transactions (B2C), and about Rs 400 transactions may seem to be negligible. However, given the situation in India, this amount seems impressive in the background of an almost non-existing regulatory framework to support e-commerce. Thus, if e-commerce-based businesses can emerge as viable propositions working within the confines of the existing not-so-conducive framework, imagine the potential that would be unleashed once we have a suitable, catalyzing framework in place! With the passing of the I.T Bill in both Houses of Parliament, a legal regulatory structure exists and what is now required effective enforcement.
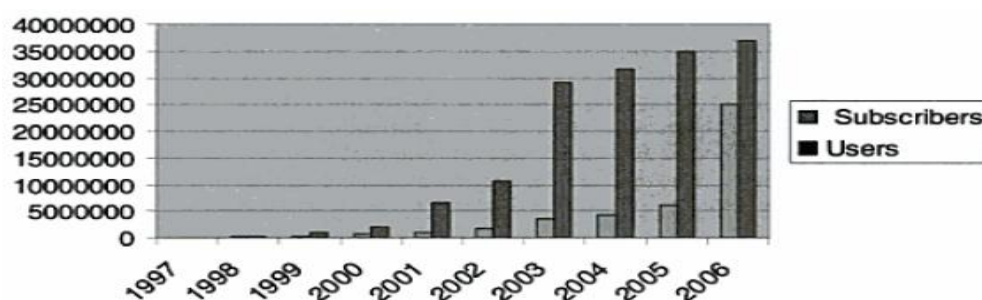
Figure 1.16: Internet and Usage in India is

Following table shows the Total E-Commerce Transactions in Inaia.

Year	Total E-Commerce Transactions
1998-1999	131
1999-2000	450
2000-2002	1400
2006	2300
2007	7000

According to the NASSCOM survey, considering the interest the Government is taking in the growth of the market, e-commerce in India will witness a significant jump over the next three years.

Based on these preliminary findings, experts have concluded that the penetration of the Internet and e-commerce transactions in India will increase by leaps and bounds. The survey findings also point to the fact that India's active Internet population would spend close to 3.2 percent of its total regular household spending through Internet purchase.

Revenue streams will increasingly be aligned with the emerging global model, it is being anticipated. This would mean that themajor part of the revenues would come from transactions, while a smaller amount would be realized from advertising.

It is expected that by 2003, more than 75 percent of the revenues of Internet business-to-consumer businesses would come from transactions. The advertisement revenues would amount to about 8 percent of the total ad spent by the companies. Analysts also believe that one of every four nonresident Indians would make some form of purchase from India-based sites.

E-commerce Opportunities' for Industries

Following are some of the area where e-commerce is witnessing rapid growth in the global markets. Indian software and services companies need to tap into some of these vertical segments to gain the maximum advantage in the e-commerce solution sector.

1. *Financial services.* A large number of users use the Internet for some form of financial guidance.

2. *Stock trading.* Online stock trading is nowadays one of the most demanding e-commerce utilities. The ability to offer market access at a competitive price is a key advantage of online stock broking companies and this is slowly happening in India too.

3. *Banking.* Internet banking is now growing. Many banks like ICICI and HDFC are making inroads into this area.

4. *Legal and professional services.* Opportunities also exist for Indian companies in legal and other professional services. There are significant legal and regulatory implications of implementing an Internet business or of migrating from a traditional off-line business. In terms of opportunities for Indian legal service providers, the requirement for professional, legal and regulatory advice is expected to increase as the number of e-commerce users increases.

5. *Tour and travel.* The travel industry has readily adapted to e-commerce. There has been a growing emphasis on the search for alternative distribution channels within the sector, particularly with the railways and the airlines, as they seek to reduce within the sector, particularly with the railways and the airlines, as they seek to reduce costs. These sectors have adapted well because of their online reservation systems.

6. *Healthcare.* Healthcare represents one of the biggest expenditures of governments worldwide. The Internet has the potential to enhance communications, streamline processes and create new business opportunities, by providing high-quality administrative services and integrating information systems.

Asian Paints—E-transforming the Organization

Asian paints, India largest paint company, are reaping the benefits of its investments in Internet-enabling its organization. Information Technology has been made use of efficient data collection, demand forecasting, reduction in working capital and online information about material flows across factories and other locations.

Given the complexity of the demand chain and the logistics and the seasonal nature of the demand, the use of the Internet in connecting the 15,000 dealers and the 55 branch offices has improved the efficiency of the supply chain. It has also increased the service levels and has cut down the working capital in the chain.

The company is also planning to do bulk transactions for its products through its website by making it a one-stop virtual storefront. The use of a comprehensive database of customers for e-relationship management is also being mulled.

ICICI Bank ---Comprehensive Transactions

ICICI Bank is using the Internet to acquire more customers by offering them a host of services. Its idea is to become a one-stop site where the account holders can do all their money transactions. On other sites one can trade online but all other transactions still have be done physically. ICICI offers the entire chain, from the Demat account in which a customer's shares are credited to the savings account from which the money is debited to settle the transaction for access.

The bank has also launched an electronic bill payment service through its internet banking service. The new payment system will do away with any paperwork since the

biller will be presenting his bills to customers through the bank's website, while the customer will pay through the Internet. For this, the customers will have to register for an Internet banking account with the bank. Thus the bank will be able to target both the B2B and B2C markets.

The Information Technology Act, 2000

The parliament of India passed its first Cyber law on the 17th of October 2000, the Information Technology (IT) Act, 2000 which provides the legal infrastructure for 3-commerce in India.
The purpose of the IT Act, 2000, as mentioned in the language of the Act is:

To provide legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication, commonly referred to as "electronic commerce", which involve the use of alternatives to paper-based methods of communication and storage of information, to facilitate electronic filing of documents with the Government agencies and further to amend the Indian Penal Code, the Indian Evidence Act, 1872, the Banker's Book Evidence Act 1891 and the Reserve Bank of India Act, 1934, and for matters connected therewith or incidental thereto.

The General Assembly of the United Nations, by its resolution A/RES/ 51/162 dated 30th January 1997, adopted the Model Law on Electronic Commerce adopted by the United Nations Commission on International Trade Law. The same resolution recommends *inter alia* that all States give favorable consideration to this Model Law when they enact or revise their laws, keeping in mind the need for uniformity of law pertaining to alternatives to paper-based methods of communication and storage of information. The Indian Information Technology Act, 2000, accordingly draws upon the Model Law.

The implementation of this Act has kick started a new era of e-governance and will have a lot of impact on the way people do business in India and will also open up new opportunities for e-business, as people would be less apprehensive about the legal hassles and issues not under the jurisdiction of law, e.g. authenticity of digital documents, hacking, digital signatures, and so on.

Therefore, it is essential for us to understand what the IT Act, 2000 offers and what its various perspectives are.

Highlights of the IT Act, 2000

For a basic understanding of the IT Act by the layman, the salient features of the Act and its relevant portions on e-business are enumerated below:

1. Electronic contracts are legally valid---EDI accorded legal recognition.
2. Legal recognition accorded to digital signatures.
3. Digital signature to be affected by use of asymmetric crypto system and hash function.
4. Security procedure for electronic records and digital signature.
5. Appointment of Certifying Authorities (CAs) and the Controller of Certifying Authorities (CCA) including recognition of foreign Certifying Authorities.
6. Controller to be appointed, who will act as repository of all digital signature certificates.

7. Certifying Authorities require getting license to issue digital signature certificates.
8. Various types of computer crimes defined and stignet penalties provided under the Act.
9. Appointment of Adjudicating Officer for holding inquiries under the Act.
10. Establishment of Cyber Appellate Tribunal under the Act.
11. Appeal from order of Adjudicating Officer to Cyber Appellate Tribunal and not to any Civil Court.
12. Appeal from order of Cyber Appellate Tribunal to High Court.
13. Act to apply for offences or contraventions committed outside India.
14. Network Service Providers not to be liable in certain cases.
15. Power to Police officers and other officers to enter into any public place and search and arrest without warrant.
16. Constitution of Cyber Regulations Advisory Committee to advise the Central Government and Controller.
17. Amendments effected in:
    (a) Indian Penal Code
    (b) Indian Evidence Act
    (c) Banker's Books Evidence Act
    (d) Reserve Bank of India Act

Important Concepts Introduced in the IT Act, 2000

Some of the important concepts introduced in the IT Act, 2000 are:
- Electronic record
- Secure Electronic Record
- Digital Signature
- Secure Digital Signature
- Certifying Authority
- Digital Signature Certificate

The concept of electronic record, as envisaged by the Act has already been described. A secure electronic record has been

Defined in the Act as follows:

Where any security procedure has been applied to an electronic record at a specific point of time, then such record shall be deemed to be a secure electronic record from such point of time to the time of verification.

The security procedures envisaged are not prescribed by the Act. The Act specifies that the central government shall prescribed the security procedures. Thus insofar as the Act is concerned, the secure electronic record is a purely legal concept and not a technological one. The application of the prescribed procedure will create a presumption, in the eyes of the law, relating to the authenticity and integrity of the record. Therefore, not only must the security of the procedure be such that it indeed offers adequate security, but it must also be demonstrated that the correct procedure has in fact been applied.

The IT Act, 2000 prescribes that electronic records are to be authenticated by means of affixing a digital signature. This digital signature must be effected by the use of an asymmetric crypto system and hash function. In contrast, the European Electronic Signature Standardization Initiative (EESSI) is technology neutral in its prescription of how an electronic signature may be effected.

This point needs a little elaboration. Until fairly recently (about 1997) it was believed that the use of asymmetric crypto systems would be the foundation for all electronic authentication. However, there is an increasing awareness that other technologies, such as *biometrics*, also offer the promise of electronic authentication. Consequently, there is greater interest in technology-neutral legislation. This type of technology-neutral specification tends

to be called electronic signature as opposed to digital signature, which is just one type of electronic signature.

The concept of a secure digital signature, as the Act puts it, is:

If, by application of a security procedure agreed to by the parties concerned, it can be verified that a digital signature, at the time it was affixed, was

(a) *Unique to the subscriber affixing it;*

(b) *Capable of identifying such a subscriber;*

(c) *Created in a manner or using a means under the exclusive control of the subscriber and is linked to the electronic record which it relates in such a manner that if the electronic record was altered the digital signature would be invalidated, then such digital signature shall be deemed to be a secure digital signature.*

It can be seen that the concept of secure digital signature is a purely legal concept rather than a technical one. The parties concerned must agree on a security procedure, and once it is demonstrated that the security procedure was indeed applied, then the digital signature will be deemed secure, and all the legal presumptions that stem from this consideration, will then be applicable.

The technical requirements for effecting digital signatures by the use of an asymmetric crypto system with has function are a private key to effect a digital signature and a public key to verify such a signature. The Act stipulates that the association between a subscriber's name and his public key should be made available by a duly licensed certifying authority in the form of a *digital signature certificate*.

The Act provides for a controller of Certifying Authorities to be appointed by the central government. The functions of the controller include licensing and regulating of operations of organizations that may act as certifying authorities.

A certifying authority provides a subscriber for a fee, with a digital signature certificate and a private key. The private key is known only to the subscriber. The certifying authority is obliged to:

1. Make use of hardware, software and procedures that are secure from intrusion and misuse.
2. Provide a reasonable level of reliability in its services which are best suited to the performance of intended functions.
3. Adhere to security procedures to ensure that the secrecy and privacy of the digital signatures are assured.
4. Observe such other standards as may be specified by regulations.

The digital signature certificate of any subscriber is used by anyone who wishes to verify a digital signature purported to be affixed by that subscriber. Thus the basic role of a certifying authority is to establish trust in the name---public key association that is contained in the digital signature certificate.

Positive Aspects for corporate sector

From the perspective of the corporate sector, the IT Act, 2000 and its provisions contain the following positive aspects:

1. The implications of these provisions for the corporate sector would be that e-mail will now be a valid and legal form of communication in our country, which can be duly produced and approved in a court of law, the corporates today thrive on e-mail, not only as the form of communication with entities outside the company but also as an indispensable tool for intra-company communication.

Till now it has been seen that the corporates in their intra-company communications on e-mail have not been very careful in using the language in such e-mails. Corporates will have to understand that they need be more careful while writing e-mails, whether outside the

company or within, as the same with whatever language could be proved in the court of law, sometimes much to the detriment of the company.

Even intra-company notes and memos, till now used only for official purposes, will also fall within the ambit of the IT Act and be admissible as evidence in a court of law, a possible consequence of the same for a typical wired company would be that any employee unhappy with a particular e-mail communication, whether received in an official or personal form, may make the said e-mail as the foundation for launching a litigation in a court of law. Further, when a company executive sends an e-mail to another to another executive in the company with some defamatory or other related material and copies the same to others, there are possibilities that he may land in a litigation in a court of law.

2. Companies shall now be able to carry out electronic commerce using the legal infrastructure provided by the Act. Till now, the growth of e-commerce was impeded in our country basically because there was not legal infrastructure to regulate commercial transactions online.

3. Corporate will now be able to use digital signatures to carry out their transactions online, these digital signatures have been given legal validity and sanction in the Act.

4. The Act also throws open the doors for the entry of corporates in the business of being certifying authorities for issuing digital signature certificates. The Act does not make any distinction between any legal entities for being appointed as a certifying authority so long as the norms stipulated by the government have been followed.

5. The Act also enables the companies to file any form, application or any other documents with any office, authority, body or agency owned or controlled by the appropriate government in the electronic form as may be prescribed by the appropriate government. India is rapidly moving ahead in the field of electronic governance and it will to be long before governments start their interactions with the public by taking applications or issuing license, permit, sanction or approvals, online. This provision can act as a great leveler as it will enable all kinds of companies to do a lot of their interaction with different government departments online, thereby saving costs, time and wastage of precious manpower.

6. Corporate are mandated by different laws of the country to keep and retain valuable and corporate information. The IT Act enables companies legally to retain the said information in the electronic form, if the
   a. Information contained therein remains accessible so as to be usable for further reference,
   b. Electronic record is retained in the format in which it was originally generated, sent or received,
   c. Details which will facilitate the identification of the origin, destination, date and time of dispatch or receipt of such electronic record are available in the electronic record.

7. The IT Act also addresses the important issues of security which are critical to the success of electronic transactions. The Act has also given a legal definition to the concept of secure digital signatures which would be required to have been passed through a system of a security procedure, to be stipulated by the government at a later, in the times to come, secure digital signatures shall play a big role in the *new economy* particularly from the perspective of the corporate sector as it will enable a more secure transaction online.

8. IT Act, 2000 has defined various cyber-crimes and has declared them penal offences punishable with imprisonment and fine. These include hacking and damage to computer source code. Often corporate face hacking into their systems and information. Till date, the corporate were in a helpless condition as there was no legal redress to such issues. But the IT Act changes the scene altogether.

However, despite the overwhelming positive features of the IT Act, 2000 for the corporate sector, some new legislation need to be enacted by the government in related areas.

Unresolved Issues in IT Act, 2000

The IT Act, 2000 does not cover the following legal issues:
- Taxation Issues that arise out of e-commerce, Internet and m-commerce, transactions.
- Domain Name Registration Policy, as Digital Copyright Issues, Trade Makers, Patents,
- Privacy and Data Protection Issues.
- Rights to e-consumers, i.e. no provision for cover under COPRA.

The IT Act does not have any clause ensuring security and protection to the online consumer while it is clear that consumers shall play possibly one of the most important roles in the success of e-commerce.

IT (Amendment) Bill, 2006

The IT (Amendment) Bill, 2006, was introduced in the Lok Sabha (Lower House of Parliament) on December 15, 2006 by Union Minister of State for Communication. According to 'Statement of Objects and Reasons' of the Bill the purpose of legislation is (1) harmonization of electronic communication and services with the Information Technology Act. (2) protection of Critical Information Infrastructure (3) to suggest penal provisions in the IT Act, Indian Penal Code, Indian Evidence Act, and the Code of Criminal Procedure to prevent the publication of sexually explicit material, video voyeurism, breach of confidentiality and leakage of data by intermediaries, e-commerce fraud like personation (phishing), identity theft, and transmission of offensive materials through communication services. The bill also seeks to enable the government to authorize service providers to collect service charges from customers as specified by the government.

Computer-related Crimes

Section 43 of the principal Act (IT Act, 2000) deals with computer-related crimes including unlawful access to computer resources, sending computer virus, damage computer systems or disrupting communication systems, denial of authorized access to computer resources to someone, manipulation of electronic money transfer. Section 66 deals with hacking while section 67 deals with publication of obscene materials in electronic form. According to the new bill both section 66 and section 67 of the principal Act will be totally substituted by new ones. Section 66 of the proposed legislation deals with computer-related crimes and according to it 'if any person, dishonestly or frequently, does any act referred to section 43, he shall be punishable with imprisonment for a term which may extend to two years, or with fine which may extend to five lakh rupees, or with both.' Section 66A makes sending offensive messages punishable which reads 'any person who sends, by means of a computer resource or communicative device that is'

a) Grossly offensive or has menacing character; or   b) any content which he knows to be false, but for the purpose of causing annoyance, inconvenience, danger, obstruction, insult, injury, criminal intimidation, enmity hatred or ill-will shall be punishable with imprisonment for a term which may extend to two years and with fine.

In order to prevent computer-related crimes and protect sensitive data The IT Bill, 206 proposes to insert a new Section (43A) to make IT Companies and service providers make it mandatory to put in place reasonable 'security practices and procedures' protection of sensitive personal data. Section (43A) says, Where a body corporate, possessing, dealing or handling any sensitive personal data or information in a computer resource which it owns, controls or operates, is negligent in implementing and maintaining reasonable security practices and procedures and thereby causes wrongful loss or wrongful gain to any person,

such body corporate shall be liable to pay damages by way of compensation, not exceeding five crore rupees to the person so affected.

Section (43A (ii)) also suggests the government discuss with various stake holders how to define 'reasonable security practices and procedures' as reads,

'security practices and procedures designed to protect such information from unauthorized access, damage, use, modification, disclosure or impairment, as may be specified in an agreement between the parties or as may be specified in any law for the time being in force and in the absence of such agreement or any law, such reasonable security practices and procedures, as may be prescribed by the Central Government in consultation with such professional bodies or associations as it may deem fit.'

As per the new bill the punishment for computer-related crimes will be reduced to two years imprisonment which was three years in the principal Act. However, fine has been increased from Rs 2 lakhs to Rs 5 lakhs.

Even though the new bill has widened the scope for the punishment for computer-related crimes, it does not address issues such as spam whereas the US has passed a separate anti-spam legislation.

Identity Theft & Personating

The proposed legislation seeks to amend the Indian Penal Code to prevent identity theft and cheating by impersonation by using information and communication technologies. The amendment (Section 417A) targets 'whoever, cheats by using the electronic signature, password or any other unique identification feature of any other person, shall be punished with imprisonment by using any computer resource or communication device will be liable for imprisonment up to five years and shall also be liable to fine.' According to Section 419A, anyone cheats by personation by using any computer resource or communication device will be liable for imprisonment up to five years and he / she shall also be liable to fine.

Publication of Obscene Material & Sexually Explicit Act

Publication or transmission of obscene material will continue to be publishable under (Section 67) but the punishment has been diluted. In the principal Act anyone who commits offence under Section 67 was liable for imprisonment up to five years but in the new bill it has been reduced to two years. The guilty will also be liable for a fine up to Rs 500000 upon first conviction. In the event of second or subsequent conviction the punishment can be up to five years imprisonment and also with a fine which may extend to Rs 1000000. In the principal Act anyone convicted in the second time is liable for 10 years of imprisonment.

In the new Bill a new Section 67 has been included to deal with publication or transmission of sexually explicit acts in electronic act form which covers child pornography. According to this section.

Whoever publishes or transmits or causes to be published or transmitted in the electronic form any material which contains sexually explicit act or conduct shall be punished on first conviction with imprisonment of either description for a term which may extend to five years and with fine which may extend to ten lakhs rupees and in the event of second or subsequent conviction with imprisonment of either description for a term which may extend to seven years and also with fine which may extend to ten lakhs rupees.

Bok, pamphlet, paper, writing, drawing, painting is exempted from liability if the publication of which is 'proved to be justified as being for the public good.' Publication or transmission of materials which is the interest of science, literature, art or learning are other objects of

general concern or which is kept or used bona fide for religious purpose are deemed to be of public good.

Intellectual Property Rights

The IT Act, 2006 has been subordinated by inserting a new clause in Section 81 of the Principal Act which says, 'Provided nothing that contain in this Act shall restrict any person from exercising any right conferred under the Copyright Act, 1957 or the Parents Act, 1970. This means any compliant with regard to violation of Intellectual Property Right will be dealt according to the provisions of the Copyright Act or Patent Act.'

Exercise

Q. 1 Define internet. Why is internet important in E-Commerce?

Q. 2What do you mean by e-com? Write difference between inter and intra organizational e-com?

Q. 3 what are the types of e-com? OR what are ecommerce models

Q. 4 explain what are the forces behind the development of e-com?

Q. 5 explain the economic potential of e-com with example?

Q.6 what are the advantages of e-commerce to traditional businesses.

Q.7 what are the disadvantages or constraints of e-commerce.

Q.8 write short note on:-
  A. peer to peer e-com,
  B. business to business e-com
  C. Consumer to consumer e-com

Q.9. Explain B2C ecommerce. OR Explain working process of B2C ecommerce model.

Q.10 what is Brick and mortar model of ecommerce.

Q.11 what are the main types of ecommerce.

Q.12 Explain the use of internet in evolution of ecommerce

Q.13 Define World Wide Web.

Q.14 what are the advantages of e-commerce

Q.15 Short note on-
  a) ISP b) URL c)internet client server Application d)Internet naming conventions

Q.16 Explain online extension of BAM model.

Q.17 what is difference between dynamic IP and static IP addressing?

Q.18 what is broadband technology? Explain types of broadband technology.

Q.19 Explain business model based on relationship of transaction types for E-commerce.

Q.20 Explain business model based on relationship of transaction parties for E-commerce.

Q.20 Explain client server architecture.

Q.21 Explain Ecommerce opportunities in India OR

Applications of ecommerce in India.

Q.22 explain information technology act 2000. OR
  Write a short note on IT Act 2000. OR
  Explain the importance of IT Act 2000 for ecommerce or e-business.

Q.23 Explain few challenges for ecommerce business in Indian market OR

Explain e-transition challenges in Indian market. OR

Explain some internal or external factors in growth of ecommerce in Indian market.

Q.24 Write a short note on IPR. (Intellectual property rights)

Q.25 Write a short note on: ISP (internet service provider)

Q.27 what is the difference between EDI and E-commerce.

Q.28 what are the advantages of Business to consumer e-commerce model.

Q.29 Explain B2B ecommerce. OR Explain working process of B2B ecommerce model.

Q.30 what are the advantages of Business to Business e-commerce model.

Q.31 Write a short note on: Consumer to consumer e-commerce model.

Q.32 List down the E-business models based on relationship of transaction types.

Q.33 Define following: 1. Network 2. Router 3. Switch 4. Internet protocol
   5. explain connectionless and connection -oriented protocol

Q.34 Explain TCP/IP Protocol.

Q. 35 State the origin and growth of e-commerce? Also explain different types of
   E- Commerce.

Q.36 Discuss the Ecommerce architecture and its components in detail with the help of a
diagram

Q. 37 Discuss how E-Commerce is helpful to business success

Q. 38 Compare and contrast the traditional business with electronic commerce in a book shop
   Business.

Q.39 With the help of any example web site explain the perspectives of the buyers and sellers
in a B2B Ecommerce web site.

Q.40 What is BAM Model in online extension?

Q.41 List the challenges in E-transition in India.

Q.42 Define E-Commerce with suitable example.

Q.43 Explain the importance of Information Exchange.

Q.44 What is Internet? What is WWW? Explain the suitable example.

Q.45 What are disadvantages of E-Commerce?

Q.46 Write a short note on Information Technology Act 2000.

Q.47 Draw a diagram for pure waterfall life cycle.

Unit-2 : E Marketing

Today's markets around the world are racing to take advantage of its interactive nature, to communicate and foster exchanges and relationships with customers, suppliers, and the public. Also, the amounts of transactions on the Internet are increasing exponentially, as shown in the Table.

TABLE 2.1TOTAL WORLDWIDE E-COMMERCE REVENUES, 2004 (B2B & B2C)

Region	Total
North America	$3.5 trillion
Asia Pacific	$1.6 trillion
Western Europe	$1.5 trillion
Latin America	$81.8 billion
Rest of World	$68.6 billion

The shopping patterns among the countries can be seen in table 2.2.

TABLE 2.2ONLINE SHOPPING PATTERNS IN TERMS OF INTERNET PENETRATION2

Category	Country Average	Lowest	Highest
Internet users	27%	6% (Indonesia)	58% (USA)
Online shoppers	10%	1% (Thailand /	27% (USA)
Online Dropouts	15%	Turkey)	32% (Korea)
Offline shoppers		1% (India)	
(But Browse online)	13%		
Future online shoppers	14%	1% (Portugal)	
		3% (Poland)	

The accelerating confluence (just like a junction between two things) of traditional print and broadcast media with new digital media like the internet has created dynamic new channels for marketers. At the same time, advertisers have begun demanding greater economic efficiency in reaching target customers. The internet is changing the design and implementation of marketing strategies.

This dynamic technology provides marketers with efficient and powerful methods of designing, Promoting, and distributing products, conducting research, and gathering market information.

E-marketing can include any internet-based promotion, including websites, targeted E-mail, Internet bulletin boards, sites where customers can dial-in and download files, and so on. The term does not have a strict meaning though, and many marketing managers use it to describe any computer-based marketing tool.

Traditional Marketing

If marketing is whatever you do to promote the sale of your products or services, then it should include:

Market research—from competitive information-gathering to industry awareness to soliciting customer opinions and preferences. Publicity from press releases to the positioning of your company and its offerings in the marketplace.

Advertising that is text-based (classifieds) and graphic-based (display)Sales, including distribution and merchandising Customer service and customer support.

Traditional marketing seems to fall far of three features. There are certain problems associated with it, which can be listed as follows:

Traditional marketing is often expensive. It can cost a lot of money to produce and print brochures, product sheets, and catalogues. It is also expensive to keep support personnel on hand to answer inquiries from customers, and it costs a lot of money in postage and shipping fees to send information to prospective customers.

Traditional marketing can be a very time-consuming process. Mistakes have to be corrected; you have to wait for months for an ad that you have placed to appear in a publication.

Traditional marketing often has a "hit and miss" quality. Marketers often send out bulk of mails to customers and yet receive a tiny response.

Moreover they feel that they do not cater to the taste of the consumers or rather that they do not come across the right consumer.

Businesses have always made their presence felt by establishing shops, factories, warehouses, and office buildings, an organization's presence is the public image it presents warehouses, and offices buildings.

An organization's presence is customers, suppliers, employees, stockholders, neighbours, and general public.

Companies tend not to worry much about the image they project until they make their mark. Initially, they focus only on their survival.

On the web, making one's presence felt is much more important. The only contact that customers and other stakeholders have with a firm on the web might be its website or its web pages. Therefore, creating an effective and appealing web page is essential even for the smallest and the newest firm operating on the web.

Identifying web Presence Goals

When a business creates a physical space in which to conduct its activities, its managers focus on very specific objectives. Few of these objectives are image-driven. An ambitious businessman must find a location that will be convenient for customers to access, with sufficient floor space features to allow the selling activity to occur, and they must take into consideration, the room space to store inventory and provide working space for employees. An added feature is the interior decoration which could enhance the business ambience, and at the same time attract customers.

The success of a business relies on fulfilling these objectives in a tangible, physical location.

On the web, businesses and other organizations have the advantage of creating a space of their own choice, design and other embellishments, good enough to make a distinctive presence. A website can have images, and can activate them by animation, thus making the customers feel and enjoy its presence. It can serve as a sales brochure, a product

showroom, a financial report, an employment ad, or a customer contact point. Each entity that establishes a web presence should decide which tasks the website must accomplish, and which tasks are most important and need to be included for promoting their business.

Different firms, even those in similar business, may establish different web presence goals, for example, Coca-Cola and Pepsi are two companies that have established very strong brand images and are in the same business, but have developed very different web presences. In figure 2.1, you can see the website of Pepsi.

Now, have a look at their competitor's site, given in next figure 2.2. These two companies change their web pages frequently.

Coca-Cola page usually includes its corporate image such as the Coke Bottles, while the Pepsi page is usually filled with hyperlinks to a variety of activities and product-related information.

These web presences project the image of each of these companies.

Each presence is consistent with other elements of the marketing efforts of these companies. Coca-Cola is maintaining its long-drawn traditional position, and Pepsi, as the upstart product favoured by the younger generation.

Achieving Web Presence Goals

An effective site is the one that creates an attractive presence that meets the objectives of the business or the organization. These objectives include:
- Attractive visitors to the website
- Making the site interesting enough so that visitors stay and explore
- Convincing visitors to follow the sit's links to obtain information
- Creating an impression consistent with the organization's desired image
- Building a trusting relationship with visitors
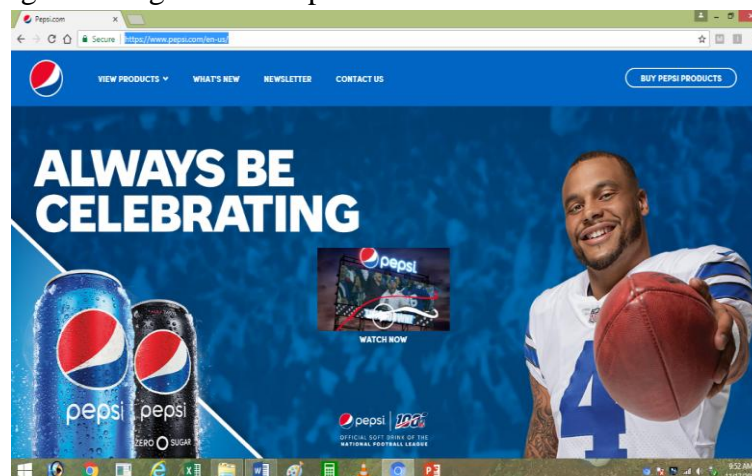
- Reinforcing positive images that the visitors
- Encouraging visitors to return to the site.

Figure 2.1   : The Pepsi Website

Figure 2.2   : The Coca-Cola Website

The website figure an web The product feature, Toyota given in following is a good example of effective presence. site provides a showroom links to detailed information about each product line, links to dealers, and links to information about the company and ancillary services it offers, such as financing and insurance. The page also offers a help link and contact information.
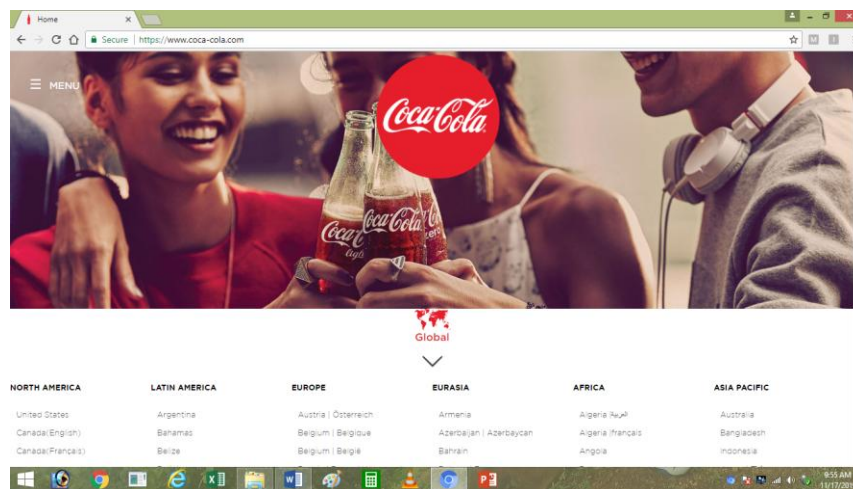
A good example of how Toyota has created a presence with this page that is consistent with its corporate philosophy is the statement that appears on the page. They build a website that illustrates why Toyota's Cars and Trucks are ideal for customers.

The Toyota example illustrates that the web can integrate the opportunity to enhance the image of a business with the provision of information. For some organizations, this integrated image-enhancement capability is the key goal of their web presence efforts. Non-profit organizations are an excellent example of this. They can use their websites as a central resource for integrated communications with their varied and often geographically dispersed constituencies.

Figure 2.3: The Toyota Website

The Uniqueness of the Web

When firms first started creating websites in the mid-1990s, they often built simple sites that conveyed basic information about their businesses. Few firms conducted any market research to see what kinds of things potential visitors might want to obtain from these websites, and even fewer considered what business infrastructure improvement would be needed to keep the site alive.

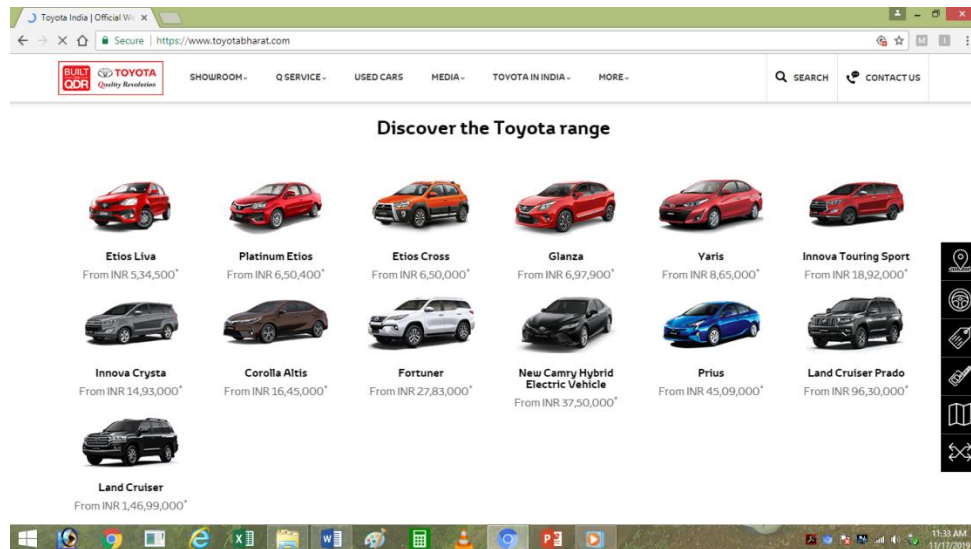For example, few firms had e-mail address links on their sites, those firms that did include an e-mail link, often understaffed the department responsible for answering visitor's e-mail messages. Thus, many of the visitors' e-mails remained unanswered. The failure to understand how the web is different from other presence-building media is one reason why so many businesses fail to achieve their web objectives. The scenario has changed for the better in the recent times with the prominence of Internet technologies over others.

Now, most of the websites that are designed to create an organization's presence in the web medium include links to a fairly standard information set. The sites give visitors easy access to its history, statements about its objectives or mission, information about products or services offered financial information, and means of communication with the organization. Such sites achieve varying levels of success, depending largely on how they convey theses information. Presentation is important, so also is realizing the fact that the web is an interactive medium.

Meeting the Needs of Website Visitors

Businesses that are successful on the web realized that every visitor to their website is potential customer. Thus, an important concern for businesses crafting a web presence is the variation in the visitors' characteristics. People who visit a website seldom arrive at it by accident; they are at it for a specific reason. The web designer who makes a site useful for everyone, needs to keep in mind some of the possible reasons listed as follows:

- Learning about products or services that the company offers.
- Buying the products or services that the company offers.

- Obtaining information about warranties or service and repair polices for products they have purchased.
- Obtaining general information about the company or organization.
- Obtaining financial information for marking an investment or credit-granting decision.
- Identifying the people who manage the company or organization.
- Obtaining contact information of a person or a department in the organization.

E-marketing Value Chain

As such, e-marketing thrives with the maintenance of strong relationship between the company and the customer. It is like a chain—the company acquires customers, customers, fulfils their needs and offers support (before and after purchase), and gains their confidence so that they return to it again. Thus the customer value is upheld. This is illustrated in figure.

| Customer Acquisition (Pre-Purchase | | Customer Fulfillment (Purchase | Customer Support (Post Purchase) |
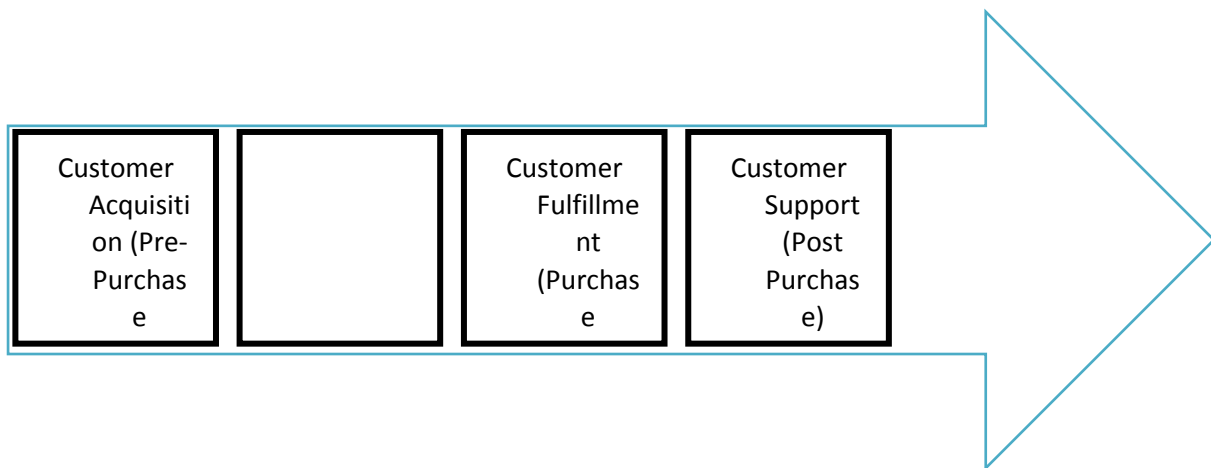
Figure 2.4: E-Marketing value chain.

Site Adhesion: content format, and access Content

A customer accesses a website for the content of that site. Initially a customer will want to navigate quickly to gain a clear understanding of the site's progression to more detailed information. The key to this is to match a user's psychological and technological sophistication profile with that of the site's initial and subsequent impact.

Format

The format of an organization's site is important with respect to the customer's technical sophistication. Vendors need to create a balance between information provision and information delivery speed. The selection of data format is crucial, as initially the goal is to create viewer interest and engage the viewer in a prolonged interaction.

Access

Online data access depends on the bandwidth requirement. The clear rule in the initial interaction phase is to use as minimal a bandwidth as a feasible to facilitate as wide an audience as possible.

Maintaining a Website

Creating a website that meets the needs of visitors with such a wide range of motivations can be challenging. Not only do website visitors arrive with different needs, but also they arrive with different experience and expectations levels. In addition to the problems posed by the diversity of visitor characteristics, technology issues can also arise.

These website visitors will be connected to the internet through a variety of communication channels that different web browsers. Even those who are using the same browser can have a variety of configurations. The wide array of browser add-in and plug-in software's adds yet another dimension to visitor variability. Considering and addressing the implications of these many visitor characteristics when building a website can help convert those visitors into customers.

One of the best ways to accommodate a broad range of visitor needs is to build flexibility into the website's interface. Many sites offer separate versions with and without frames and give visitors the option of choosing either one. Some sites offer a text-only version. As researchers at the trace centre (http://trace.wisc.edu/) note, this can be an especially important feature for visually impaired visitors who use special browser software, such as the IBM Home Page Reader, to access website content. The W3C Web Accessibility Initiative site includes a number of useful links to information regarding these issues

If the site design uses graphics, the site can give the visitor the option to select smaller reasonable amount of time. If the site page will load on a low-bandwidth connection in a reasonable amount of time. If the site includes streaming audio or video clips, it can give the visitor the option to specify a connection type so that the streaming media adjusts itself to the bandwidth of that connection.

A good site design lets visitors choose among information attributes such as level of detail, forms of aggregation, viewing format and downloading format. Many e-commerce websites give visitors a selectable level of detail, presenting products information by product line. The site presents one page for each line of products. A product line page contains pictures of each item in that product line, accompanied by a brief description. Using hyperlinked graphics for the product pictures, the site offers

visitors the option of clicking the product picture to get the page containing a detailed description of that product.

Websites can also offer visitors, multiple information formats by including links to files in those formats. For example, the page offering financial information could include links to an HTML file, an Adobe PDF file, and an Excel spreadsheet file. Each of these files could contain the same financial information formats, allowing visitors to choose the format that best suits their immediate needs. Visitors looking for a specific financial fact might choose the HTML file so that the information would appear in their web browsers, other visitors who want to copy of the entire annual report as its was printed would select the PDF file and either view it in their browsers or download and print the file. Visitors who want to conduct analysis on the financial data would download the spreadsheet file and perform calculations using the data in their own spreadsheet software.

To be successful in conveying an integrated image and offering information to potential customers, businesses should try to meet the following goals when constructing their websites.

- Convey n integrated image of the organization.
- Offer easily accessible facts about the organization.
- Allow visitors to experience the site in different ways and at different levels.
- Provide visitors with a meaningful, two-way (interactive) communication link with the organization.
- Sustain visitor attention and encourage return visits.
- Offer easily accessible information about products and services and how to use them.

Metrics Defining Internet Units of Measurement

Thee-commerce world has, since the establishment or starting point been attempting to measure parameters associated with the Web and websites in order to assess two things:

1. Advertising--how many people saw our banner ad*?*

2. Visitation-how many people came to our site*?*

For advertising, the metrics measured and their interpretation depend on the position of the measure. The advertising perspective is that metrics can give the advertiser the most accurate interpretation of the customer-to-site usage ratio, but this has come

under increasing scrutiny as the technology and systems associated with Web interfaces and networks become well understood by the advertisers. There is a problem with using hits as a measuring tool.

What advertisers want to measure includes the number of unique visitations to a site, as well as multiple other parameters, such as the duration of each visit. The number of hits (visits) is calculated based on a frame of text or image file.

Sometimes, a single page may be made up of many of these. Thus, it distorts the hit count. An alternative is to use a metric calculation which uses the whole page as a metric. The problem with this is that a page is cached into the memory of a 'reader' or a Web browser.

One visit to the page counts as one hit. But if the user then swaps between tasks and pages, this page may actually be read many times, which should be counted as multiple hits. Another problem is the user who utilizes a 'bot' or a self-propelled search engine to find some information.

This search agent will visit sites on the owner's behalf, but will not actually report anything about the sites visited back to the owner, thus throwing off the hit count.

In-software metrics theory, one problem is the separation of direct and indirect metrics or measurement. Direct measurement of an attribute is the measurement that does not depend on the measurement of any other attribute. Indirect measurement of an attribute is the measurement that involves the measurement of one or more other attributes. Examples of direct metrics are shown in Table 2.3.

TABLE 2.3

EXAMPLES OF DIRECT METRICS

- Number of individual, authenticated user sessions.
- Authenticated user sessions by location.
- Authenticated user profiles by region.
- Top 'entry' and 'exit' pages by authenticated users.
- Most-downloaded files.
- Advertising 'captures'
- Most-active, authenticated organizations accessing the site.
- Most-active countries, states, cities, and regions by authenticated users.
- Organizational breakdown of site access by authenticated users.
- Maximal, minimal, average number of authenticated users per period.
- Most-used browsers.

- Spiders or bot activity.
- Most-used platforms.
- Successful form submissions.
- Failed form submissions.
- Server error log (404 errors and the like)
- Top referencing sites.

&Examples of indirect metrics can be seen in Table 4.4.

TABLE 2.4

EXAMPLES OF INDIRECT METRICS

- Number of hits per page.
- Number of successful hits per page.
- Number of hits for total site.
- Number of hits per page, per session, per individual user.
- Average user session time in seconds.
- Most-accessed segments.
- Top paths through site.
- Views of banners.
- Hits by user groups.
- Total hits.
- Cached hits.
- Successful hits.
- Failed hits

Many organizations are using the indirect metrics, as advertised by the vendors of packages and software tools, and this will significantly do something for the executives of these firms to track directly the impact of their dollars being spent on their websites. However, having some of these metrics even as partial views of the activities occurring in a site, is better than having nothing.

Organizations in the online customer acquisition phase have attempted to refine some of the indirect metrics to their needs, by understanding their limitations. These include the following:

1. **Click-through captures: -**How many users click through to the next stage in the customer acquisition process*?*

2. **Time spent.** How long did the viewer stay at the site and which items, pages or routes did the viewer select to navigate through the site*?*

3. **Time spent searching.** Did the viewer use the 'site map' or 'search feature, and if so for what and for how long?

4. Time spent before click-through. How long did a viewer linger in the opening stages of the interaction and where*?*

5. E-mails and telephone calls. How many e-mails or calls did this section generate and on what issues?

6. Registered users. If the site has a registration facility, what is the rate*?*

By assessing these metrics in conjunction with data from other sources such as the direct sales and marketing channels, an organization can estimate the content, format, and accessibility of the online site. Though not perfect, it does provide a useful set of parameters from which to judge the site's effectiveness to retain eyeballs and potential future customers.

The Browsing Behaviour Model

Customers of an e-commerce site interact with it through a series of consecutive and related requests made during a single visit called s*ession.* Within a session, customers can issue requests of different types, such as Login, Browse, Search, Add to Shopping Cart, or Pay.

Different customers may exhibit different patterns of navigation through an e-commerce site and therefore may invoke the different functions provided by the site in different ways and in different frequencies.

Some customers may be heavy buyers while others may be occasional buyers who do extensive searching and browsing, but very rarely buy from the site. The customer's behaviour while interacting with an e-commerce site has impacts on the IT resources of the site and on the revenue of the e-store. Thus, it is important to be able to characterize the behaviour of customers or groups of customers of an e-commerce site.

The customer model captures elements of user behaviour in terms of navigational patterns, e-commerce functions used, frequency of access to the various e-commerce functions, and times between accesses to the various services offered by the site. A customer model can be used for navigational and workload prediction, so that better websites can be modelled.

Browsing Behaviour Model of an Online Video Store

Let us use an example of an online video store to give an informal introduction to the user behaviour model of an e-commerce site. Consider an online video store in which customers can perform the following functions:

1. Connect to the home page and browse the site by following links to bestseller videos and promotions of the week per video category.
2. Search for titles according to various criteria including keywords and title.
3. Select one of the videos that results from a search and view additional information such as a brief description of the product/products, price, shipping time, ranking, and reviews.
4. Register as a new customer of the virtual video store. This allows the user to provide a username and a password, payment information (e.g. credit card number), mailing address, and e-mail address for notification of order status and videos of interest.
5. Login with a username and password.
6. Add items to the shopping cart.
7. Pay for the items added to the shopping cart.

Thus, during a visit to the online video store, a customer issues requests that will cause these functions to be executed. For example, a customer may cause a search to be executed by submitting a URL that specifies the name of an application to be run at the server through a server **Application Programming Interface(API)** and the keywords to be used in the search.

The application will then execute a search in the site database and return an HTML page with call the videos that match the search criteria. Remember that the sequence of consecutive requests issued by the same customer during a single visit to an e-commerce site is called a *session.*

A customer may be classified as being in different states, according to the type of function (i.e. request) requested during a session. For example, the customer may be browsing, searching, registering as a new customer, logging in, adding videos to the shopping cart, selecting the result of a search, or paying for the order.

The possible transitions between states depend on the layout of the site. For example, one customer may go from the home page to search, from search to select, from select to add to cart, and from there to the payment area. Another customer may go from the home page to the browse state before doing a search and leaving the online video store without buying anything.

To capture the possible transitions between the states in which a customer may be found, we need a model that reflects the navigational pattern of a user during a visit to an e-commerce site (Figure 2.5).
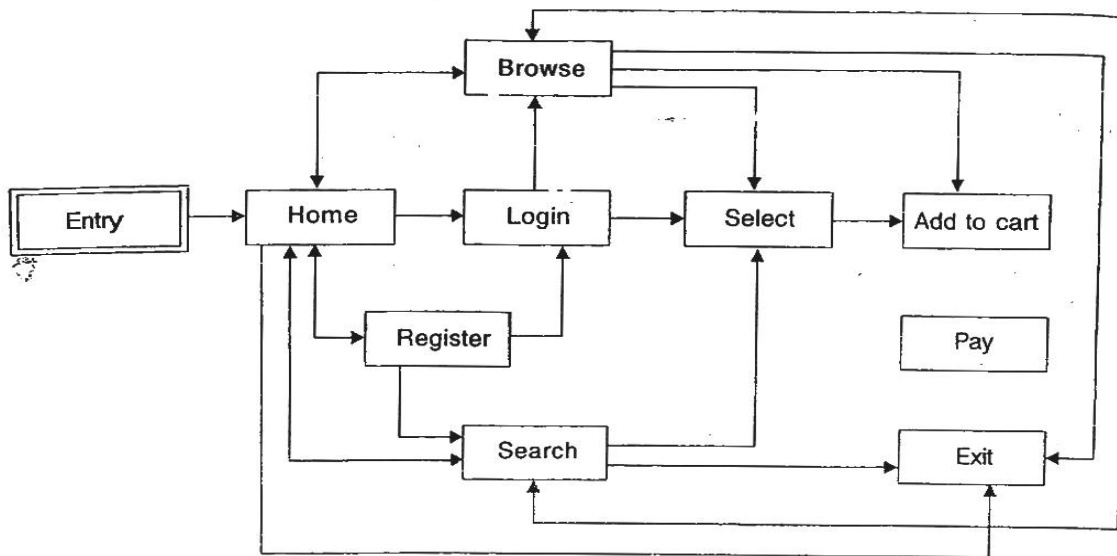
transitions of the BBMG for the virtual videostore.

The given model is in the form of a graph and is called the Browser Behaviour Model *G*raph (BBMG)." The nodes of the BBMG, represented by rectangles, depict the states a customer is in during a visit to the e-commerce site. Arrows connecting the states indicate possible transitions between them.

Entry

This is a special state that immediately precedes a customer's entry to the online store. This state is part of the BBMG as a modelling convenience and does not correspond to any action initiated by the customer.

Home

This is the state a customer is in, after selecting the URL for the site's home page.

Login

A customer moves to this state after requesting a login to the site. Sometimes, even a home page may ask him to login.

Register

To have an account created by registering with the online video store, the customer selects the proper link for the registration page, thus making a transition to the Register state.

Search

A customer goes to this section after issuing a search request.

Browse

This is the state reached after a customer selects one of the links available at the site to view any of the pages of the site. These links include the list of bestsellers and weekly promotions.

Select

A search returns a list of zero or more links to videos. By selecting one of these links, à customer moves to this state.

Add to Cart

A customer moves to this state upon selecting the button that adds a selected video to the shopping cart.

Pay (Billing)

When ready to pay for the items in the shopping cart, the customer moves to the Billing section.

Exit

Customers may leave the site from any state. Thus, there is a transition from all states, except the entry state, to the exit state.

In the case of Figure 4.5, customers can enter the virtual video store at only three states: Home. Browse and Search. From the Home state, they can visit the Register, Login, Browse, and Search states, as well as exit from the site.

This figure reflects all possible transitions between states. However, during a single visit to the e-store, a customer may not visit all states, or there may be different visits by the same customer to the site, or there may be visits from different customers in terms of the frequency by which these states are visited.

Thus, to characterize the user behaviour during a visit to the site, one must also capture the frequency with which transitions occur.

Consider that during a visit to the e-commerce site, a customer visits the Select state forty times. Out of these, the customer moves to the Search state sixteen times, to

the Browse state fifteen times, to the Add to Cart state eight times, and once to the Exit state.

W*e* can then say that the transition frequencies out of the Select state are: 0.40 (=16/40) to Search state, 0.375 *(=15/40)* to Browse state, 0.2 *(=8/40)* to *A*dd state, and 0.025 (=*1/*40) to state Exit.

In general, we label each transition in the BBMG with the frequency with which a customer follows the path between two states. Since we use BBMGs to characterize the behaviour of many similar visits to the site, we refer to the transition frequencies as transition probabilities.

For example, according to the BBMG of Figure 4.5, customers have a 10 per cent probability of leaving the site after performing a search. This is indicated by a transition from the Search state to the Exit state.

From the Search state, customers have a 20 per cent probability of going to the Home state, a 25 per cent probability of doing another search, a 20 per cent probability of selecting one of the videos that resulted from the search, and a 25 per cent probability of going to the Browse state.

Different types of users may be characterized by different BBMGs in terms of the transition probabilities. As an example, consider two customer profiles-occasional and frequent buyers.

The first category is composed of customers who use the Web store to find out about existing products, such as new books or best fares and itineraries for travel, but exit most of the time without buying or selecting.

The second category is composed of customers who have a higher probability of buying if they see a product that interests them and is affordable. Thus, workload characterization for e-commerce entails in determining the set of BBMGs that best characterize customer behaviour.

Note that it is possible for the same customer to exhibit different types of behaviour during each visit to the site. Thus, a BBMG is in fact associated to a visit to the site and not necessarily to a specific customer.

Aggregate Metrics for E-business Sites:

Since the Web became a widely used vehicle to support all sorts of applications, including e-business, the need arose to devise metrics to measure a site's efficiency in

attaining its goals. Table 4.5 lists common e-business functions when customers get on to an e-business website.

TABLE 2.5

AGGREGATE METRICS FOR E-BUSINESS SITES

Category	Function	Description
Common	Login Register Search Select Browse	Login to the site. Register as a new user. Search site database. View one of the results of a search. Follow links within the site.
Retail	Add Item Remove Item See Shopping Cart Create Registry Add to Registry Check Status Pay	Add item to shopping cart. Remove item from shopping cart. Check contents and value of shopping cart, Create a gift registry. Add item to gift registry. Check status of previous order. Pay for items in shopping cart.
Information	Download Subscribe Listen Watch	Download software/report/music. Subscribe to regular downloads. Listen to real-time audio (e.g. lecture). Watch real-time movie.

Many metrics have been used to assess the success of sites in terms of popularity and/ or revenue generated. Some of the standard metrics are as follows:

Hits/Second

This measures the number of requests for objects served in each second by a website. A page is usually composed of one HTML file and several other embedded image files that are automatically requested from the Web server when a user requests the HTML document. So, hits/second counts not just the HTML pages but all embedded objects in a page as separate requests, which does not give an exact idea of the number of times a specific page, with its advertisement banners, was viewed.

Page Views/Day

This reflects the number of individual pages served per day. A company paying for a banner ad to be posted on a page may be interested in the number of times its ad is being seen. Very popular sites can display a few hundred million page views per day.

Click-troughs

This measures the percentage of users who not only view an online ad but also click on it to get to the Web page behind it. This metric is oriented more towards assessing the impact of online ads.

However, this measure can be misleading. If the message in the banner ad is too general, it may draw a larger number of clicks than a more specific message. However, users who respond to the more specific messages are more likely to be interested in the product being advertised than those who react to the more general message.

Unique Visitors

This indicates how many different people visited a website during a certain period of time. Many times it is more important to know how many different people visited your site than the total number of visits received during a certain period.

Revenue Throughput:-

This is a business-oriented metric that measures the number of dollar*s/*sec derived from sales from an e-commerce site. This measure implicitly represents customer and site behaviour. A customer who is happy with the quality of service (e.g. response time) of an e-business site will shop at the Web store, and the revenue throughput will increase.

Potential Loss Throughput

This is another business-oriented metric that measures the amount of money in customers shopping carts that is not converted into sales because the customer leaves the site due to poor performance or other reasons.

Online Marketing

Online marketing means using the power of online networks, computer communications and digital interactive media to reach your marketing objectives. Online marketing will not replace traditional forms of marketing anyway. Instead, it will both add to and subtract from today's marketing mix.

It will add more interactivity. But it will subtract costs. It will add more customer choices. But it will remove marketing's dependence on paper. It will add "information value" to products and services. But it will take away barriers to starting a business or extending a business into international markets.

And most importantly, it will turn upside down some old notions we have held of what marketing is all about.

There are three new market segments which are as follows:

Cyber buyers

These are professionals who spend a good deal of time online, mainly at their places of business. These professionals often have to make complex purchasing decisions that require reams of data and difficult to locate sources of supply, all within a tight time frame. That is a perfect fit with the capabilities of online technology.

Cyber consumers

These are the home computer users wired up to commercial online services and the Internet. This group represents the pot of gold, and marketers simply need to find ways to make it more attractive to shop and buy online than to go to the local store.

Cyber surfers

They use online technology to expand their business future plans, challenge their abilities, and for fun. This segment is typically younger, and possesses shorter attention spans.

Some of the important aspects of marketing are advertising, sales, security of the transactions and the mode of payment used for payments. And all of these have had to adapt and change themselves according to the demands of the Internet.

How Should Buyers Pay Online?

The marketplace, as usual, is responding quickly to this concern. A few basic models or approaches to net-based sales transactions are beginning to come into focus. They are:

1. The consumer, responding to net-based marketing presentation, sends in a cheque, or calls and verbally transmits a credit card number, over the merchant's telephone. This is a fairly traditional approach, and no financial transaction takes place on the Internet.

2. The consumer (i) sets up an account with a merchant or a third party organization, (ii) leaves his or her credit card number by means other than the

Internet, and (iii) gives the merchant the authorization to bill the account, whenever the consumer chooses to buy something.

3. The consumer leaves his or her credit card number on an unsecure online order form. With this approach, the consumer is put at some risk that the credit card number will be compromised, but the risk is perhaps not much greater than giving it out over the phone.

4. The consumer uses a secure (encrypting) client software program to transfer his or her encrypted credit card number to a secure (decrypting) merchant server.

5. The consumer exchanges traditional currency (cash, cheque, credit card authorization) for some form of digital currency, and then spends units of that currency whenever and wherever he or she likes. This requires some form of "electronic wallet" to hold the currency and an account set up between the currency provider and the participating merchants.

Advantages of Online Marketing

Some of the advantages of online marketing can be listed in the following manner: ...

1. Online marketing offers bottom-line benefits that tie in directly to the demands placed on the organization trying to make a transition into the new economy.

2. Online marketing can save money and help you stretch your marketing budget. Electronic versions of catalogues, brochures, and specification sheets do not have to be printed, packaged, stored, or shipped. These can be updated online, and hence, you need not have to send them back to the printer for changes. This saves a lot of money.

3. Online marketing can save time and cut steps from the marketing process. Marketers no longer have to wait for one of their sales representatives to give them the desired information. They can get it online on their own. E-mail allows you to exchange information with potential buyers quickly. It helps you get your message out to the market in after a short time, with online brochures, catalogues and so on.

4. Online marketing gives customers another way to buy, while enabling them to take control of the purchasing process. Today, customers want more. They want more information about the products they buy; more input into the product itself, and support after the sale. Smart marketers can expects maximum profit between working together in online communications by encouraging the customer to get engaged in making decisions about the product. They can choose the color, select the shipping

method, and place the purchase order themselves. The more you can get the customer involved in the process of customizing the product and the selling process to meet their particular needs, the more likely it is that you will get the sale.

5. Online marketing can be information-rich and interactive. It appeals to information hungry buyers and analytical buyers. It allows buyers and current customers to search and locate the information they need quickly.

6. Online marketing can offer you instant international reach and indeed, online networks have created an instant global community. Online marketing erases the time and distance barriers (barrier i.e. a problem which prevents two groups from agreeing or communication.) that get in the way of conducting business transactions with customers in other countries.

7. Online marketing can lower barriers to entry and offer equal opportunity for access. When you are doing business online, distinctions related to the ethnic background or gender or even the size of business does not seem to matter as much. The online world is a great leveler (leveler i.e. a situation where distinctions of class, qualities are immaterial). And online marketing helps to lower many of the marketplace barriers that have held some would-be entrepreneurs from full participation in the free market system.

8. Online marketing can be continuously available. One of the best attributes of and online information server is that it is always on the job, twenty four hours a day 365 days a year.

Various Businesses that Can Flourish (Flourish i.e. Attract you) on the Internet:

Banking

The advent of Automated Teller Machines (ATM) has long extended banking into a domain of activity of computer-network-enabled services. Now, online banks are being set up exclusively to serve clients through the Internet, with the full range of banking services –deposits, withdrawals, funds transfer, loans and other form of transactions.

Simultaneously, online financial services are being offered by other companies, bringing investment opportunities to customers. And several companies are offering e-cash services.

Databanks

In the information economy, pure data is emerging as a hot commodity. With the ease and low cost of delivering information over the Internet pushing down prices, data-vendors are building profitable businesses in the market space.

Convenient mechanisms for searching databases are making information services use-friendly as well and importantly, businesses are also springing up to enable data-shoppers to hunt for the information they need, in the form of search engines which search millions of documents on the Internet to track down information.

Music

Since it is recorded and stored digitally, music as well as the other audio products are the perfect products for distribution over the Internet. Instead of buying cassettes or CDs, customers can simply download the recordings from the site.

The world's top music labels are setting up websites from which Internet shoppers can buy their favourite pieces. They are also creating customer involvement by setting up virtual communities of music aficionados who can access sample, value-added information, such as lyrics and scores, directly through the Internet.

Retailing

Two genres of online shopping malls are being set up by digital entrepreneurs. The first consists of multimedia catalogues which shoppers can download through the Internet without taking physical delivery.

The second variety is a supermarket service that offers gateways to the websites of scores of other shops, acting as a single window for virtual shoppers. With electronic payment systems becoming secure, customers will soon complete entire retailing transactions on the Internet.

E-advertising

Advertising is a $500 billion worldwide industry that, until now, has been mainly a one-way street, with consumers passively absorbing advertising messages. Advertisers hoped that potential buyers would remember their slogan or jingle long enough to make a trip to the store and purchase the product.

This has changed with the advent of interactivity. The new concept of 'interactivity' has *o*verpowered the traditional concept of advertising, by putting the buyer in the driver's seat. Interactivity allows consumers to increase their control over the buying process. We are all deluged with an overflow of data. We long for a sense of mastery over the information that washes over us. Given the opportunity, we will be more selective about the kind of information we choose to receive. Interactivity gives us that option. Thus, the audience is not captive any more, and the marketers would have to work harder than before to entice them. The marketing efforts will have to be information-rich and user-friendly.

Web-based advertising has become an important part of a company's media mix. Numerous companies are committing large advertising budgets to the Internet.

Following are the reasons for the growing importance of e-advertisements:

1. People increasingly prefer to surf the Internet rather than watch TV.

2. The target audience goes to the advertisement, rather than the other way around.

3. Development of business search engines by companies such as C2B Technologies, which aim to link buyers with online bargain sites for over a million products for comparison-shopping purposes.

4. Yahoo! has a business unit which offers contests and prizes to online participants, which drive players to the websites of different clients. To play, participants must provide certain data, including their preference of advertisements and tastes, which presents a valuable database as to customer preferences.

5. The growth of e-business. Dell Computers, for example, estimates that by 2005, 85 per cent of its sales will be through the Internet.

6. The Internet is not geographically restricted. *Amazon.com* sells 20 per cent of its books to foreign destinations, whereas a physical book store serves an area of only a few square miles.

Various Means of Advertising

E-mail:-

The advantages of e-mail are its low cost and its ability to reach a wide variety of targeted audiences. Most companies develop & customer database, to whom they send e-mails. E-mail is emerging as a marketing channel that affords cost-effective implementation and better, quicker response rates than other advertising channels.

Marketers should be racing to embrace the medium. Sometimes, it may also happen that when every marketer starts overflow of prospects and customers with e-mail, the consumers may react negatively.

Banners:-

They make up 50 per cent of online ad revenues, but their effectiveness may be waning. When IBM kicked off banner ads in 1994 on tech site Hotwire, 30 per cent of the people who saw the ads clicked on them. Now the overall click-through rate for banner ads has dropped to a measly 0.3 per cent.

But it is the most commonly used form of advertising on the Internet. As you surf your way through the information superhighway, banners are everywhere. The smaller the file size, the quicker it gets loaded.

Typically, a banner contains a short text or a graphical message to promote a product. A major advantage of using banners is the ability to customize them to the target audience. One can decide which market segment to focus on.

Skyscrapers :-

These are the extra-long skinny ads running down the right or left side of a website.

Banner Swapping :-

Banner swapping is nothing but a direct exchange of links between websites. To be precise, company A may agree to display a banner (in the form of a link) of company B in exchange for company B displaying company A's banner.

Streaming Video and Audio :-

Companies and content networks including RealNetworks, NetRadio, and Music Vision, insert ads for marketers into music and video clips, as consumers listen to them. It is much more like the TV that marketing advertisers know and trust. You can get click-through rates of about 3.5 per cent, according to RealNetworks. Its widespread use will depend on high speed Internet connections.

Effectiveness Tracking :-

This is an upstart DynamicLogic designed by a pioneering service to help traditional advertisers gauge the impact of their marketing by placing tiny files, called cookies, on viewers' computers. This helps them track where people go after seeing their ads.

Mini-sites, Pop-ups :-

These ads burst upon the screens, allowing companies such as Volvo and SmithKline Beecham's Oxy acne medicine to dish up games and product information. Mini-sites allow advertisers to market without sending people away from the site they are visiting. This type of advertising also gets higher click rates. Sometimes, these can be intrusive and annoying.

Interstitials :- (an advertisement that appears while a chosen website or page is downloading.)

Visit the railway site *(www.indianrail.gov.in)*. When the site uploads, a new window will open in your browser from Citibank, asking you to apply for a loan. These windows are called interstitials, and they demand your attention because you must click on them, even if only to close the window. It is estimated that the click-through rates are as high as 5 per cent.

Sponsorships :-

Sponsorships can vary from a simple sponsorship of an e-mail list to much more sophisticated site sponsorship deals. For example, the e-retailer 800.com (www.*800.com*) sponsored a list of the top 10 videos which appeared alongside the 800.com logo on the Hollywood stock exchange(www.*hsx.com*). By clicking on one of the video titles, visitors were transported to the 800.com site, where they could purchase the video. The advantage of sponsorships is that they can help to build a sponsor's brand by presenting it within the context of the sponsored site and by creating value for visitors to that site.

Coupons :-

Companies such as cool savings (www.coolsavings.com) offer their members discount coupons which they can print out and then use for both online and offline

retailers. Coupons can be an attractive marketing mechanism because they encourage product trial, and they are a way of selectively discounting prices to the most price sensitive customers (those are willing to go to website and print out a coupon).

Pay Per Advertising View :-

Companies such as Cyber Gold "pay" customers to view advertisements. The approach uses the accountability of the Web to reward consumers for processing the "right" kind of information.

Loyalty Programs :-

Companies such as click rewards (www.*clickwards.com*) offer their members the chance to earn a currency, such as airline miles, by shopping at their network of partner sites. The economics of customer retention are well known. An existing, loyal customer is much more profitable than a new one, so rewarding existing customers to encourage them to remain loyal can be a good tactic.

Partnerships :-

While many offline companies arrange partnerships, the use of partnerships is more widely in the New Economy. Similar to the manner in which complementary companies often collaborate to push a new technology, Web companies often partner with complementary sites to quickly provide a more value-enhanced service to site visitors. One prevailing strategy is to select a customer niche and provide services that encompass the customer's entire needs in that area.

Innovative Customer Acquisition :-

As the Internet market becomes more competitive, competitive advantage will be derived from innovative marketing. One form of innovative marketing is to ally with groups. (or associations, and provide a complementary service that benefits the group's membership.. By creating such an alliance, a new site can launch with a large customer base without incurring expensive and risky marketing fees. In such an arrangement, a site generally says the group a fee for access to its membership.

Providing Information :-

The Web allows sites to instantly offer information that is relevant to their customer base. Many sites provide instantly accessible information to their customers as a form of marketing and product differentiation. The e-commerce market for travel (airlines, hotels, etc.) is very competitive, with many well-funded players. Sites try to differentiate themselves by offering vast amounts of information to their customers. Travel information can range from top restaurant and hotel information targeted toward expense account business travellers, to time sensitive travel information to budget-minded leisure travellers. Customers evaluate the information they receive and establish a relationship with the site that best meets their needs. Sites try to capitalize on this relationship by offering e-commerce opportunities like travel reservation services.

Leverage the Customer Base :-

A primary goal of e-commerce businesses today is to invest heavily in creating a large customer base and establishing a relationship of trust with their customers. Many firms are trying to establish a reputation that conveys to its customer base that they are a solid company that is good at fulfilling e-commerce orders.

Eventually, as a company establishes a large and loyal customer base, the goal is to leverage this relationship by offering an expanded product/service selection to its customers. Amazon has successfully leveraged its customer base. Within four months of offering CDs and six weeks of offering videos, Amazon was the top-selling site for both products.

Personalized Online Communications

Online companies have the opportunity to reduce mass-marketing expenses and increase response rates by developing marketing strategies that center around each individual customer.

The manner in which transactions occur on the Internet provides e-commerce companies with detailed information on their customers. Information derived from customers registering preferences and demographic information, as well as firms analyzing past purchases and Web-surfing habits, provides e-commerce companies the opportunity to create a one-to-one marketing relationship with each of their customers.

In addition to this information, many e-commerce companies use their sites to establish a two-way dialogue with their customers. This dialogue provides additional information regarding product desires and better avenues to market them. We categorize personalized marketing into five primary forms: (1) permission marketing, (2) personalized recommendations, (3) personalized advertisements, (4) personalized web pages, and (5) personalized e-commerce stores.

1. Permission marketing. Seth Godin coined the term permission marketing to describe how successful e-mail campaigns can result from creating relationships with customers. Permission marketing has become the current rage of online marketers and has led to increases in marketing response rates.

Permission marketing presumes that successful marketing campaigns can be created by establishing a mutually beneficial and trusting relationship between the firm and its customers. In exchange for some offered benefit, customers volunteer information about themselves and, in essence, ask to be marketing targets.

Once customers initiate this relationship, they look forward to e-mail messages because they know that these messages will be on relevant topics. By using the permission marketing philosophy, online firms create a valuable database of customers who have given the firm the permission to market to them and are receptive to marketing messages.

Permission marketing e-mails must be relevant to the consumer. Relevance can range from general interest to very specific interest. Response rates and trust can increase by sending permission marketing e-mails that are highly specific to customers' interests. Many online firms ask their permission marketing customers for detailed personal information when they sign up for e-mails.

This information allows them to send more targeted e-mails to specific segments of the firm's customer base. Customers appreciate these targeted e-mails, and this increases their relationship level with the firm. The associated increased trust level may also induce customers to reveal additional information about them.

2. Personalized recommendations. Many e-commerce sites have personalized services that make specific merchandise recommendations for each user based on past purchases, web pages viewed, and survey information that the user has provided.

3. Personalized advertisements. Websites increasingly are using personalized technology software to determine dynamically, in real time, which Web advertisements should be exposed to viewers. ZDNET uses personalization technology that is based on an analysis of five user profile and impression environment variables.

Variables used include the user's past click behaviour, time of day, the page, belonging to frequency of visits, and search keywords. Based on these variables, users are given a relevancy score (i.e. indicator of the probability of a click), and ads that are most likely to be of interest to the viewer are displayed.

4. Personalized Web pages. Many portals and e-commerce sites allow users to create their own personalized Web page. This allows users to create a Web page that caters exactly to their interests. Personalization encourages users to return more often and increases the user's familiarity and trust with the Web page.

This leads to users spending more time on the website, thereby increasing advertising exposure time. Since a creator/user of a personalized Web page reveals detailed personal information, the site sponsoring the personalized Web page can deliver more targeted consumers to advertisers. This results in an opportunity to charge increased ad rates to reach specific customer groups.

At portal site Excite, users can create a personalized portal page using Excites 'My Excite service. Excite found that users who create a 'My Excite' personal page come back five times as often as others, and view twice the number of pages compared to Excite users who do not have a personal page. This has allowed Excite to reap higher advertising revenues. In addition, personalization

Increases users' switching costs.

5. Personalized e-commerce stores. One of the goals of online merchants is to use Internet technology and their knowledge about individual consumers to tailor their products and services for each of their customers.

Jeff Bezos, Amazon's chairman, has stated that one of his goals is to have his "store redecorated for each and every customer." However, he cautions that it could take up to 10 years to achieve such individual customization. Office Depot offers its small-business customers personalized catalogues, allowing businesses to create real-time unique catalogues for their employees, based on their buying authority.

In addition to making their customers' shopping experience more pleasant, personalization is a key tool for increasing switching costs. If a customer is satisfied and becomes dependent on a site that offers personalized services, it will be more costly to switch sites. Even if a competing site offers superior services, there is a certain inertia that often slows users from switching sites.

Conducting Online Market Research

The Internet is a powerful and cost-effective tool for conducting market research regarding consumer behaviour, identifying new markets, and testing consumer interest in new products. Interest in interactive Internet research methods is on the rise.

Market research that utilizes the Internet is frequently more efficient, faster, and cheaper, and allows the researcher to access a more geographically diverse audience than those found in offline surveys. Furthermore, the size of a market research sample is a key determinant of research design.

The larger the sample size, the larger the accuracy and the predictive capabilities of the results. On the Web, market researchers can conduct a very large study much more cheaply than with other methods.

The Internet-based market research is often done in an interactive manner by allowing personal contacts with customers, and it provides marketing organizations with greater ability to understand the customer, market, and the competition.

For example, it can identify early shifts in products and customer trends, enabling marketers to identify products and marketing opportunities and to develop those products that customers really want to buy. It also tells management when a product or a service is no longer popular. To learn more on market research on the Web, see the tutorials at *Webmonkey.com.*

Online market researchers have to address numerous issues. For example, customers may refuse to answer certain questions. Also, the administration of questionnaires can be lengthy and costly.

Furthermore researchers risk losing people who do not complete online questionnaires because they may not have the latest, fastest computers or a fast Internet connection. For example, long download times and slow processing of Web-based questionnaires lead only to frustration on the part of the customers; it can convince them not to return to a site, leading to lost respondents and future sales.

Online Market/Research Process and Results

The steps in conducting online research are shown in Figure 2.6.

| Problem definition and research objectives | → | Research methodology, Data collection plan | → | Data collection, Data analysis | → | Results, Recommendations, Implementation |
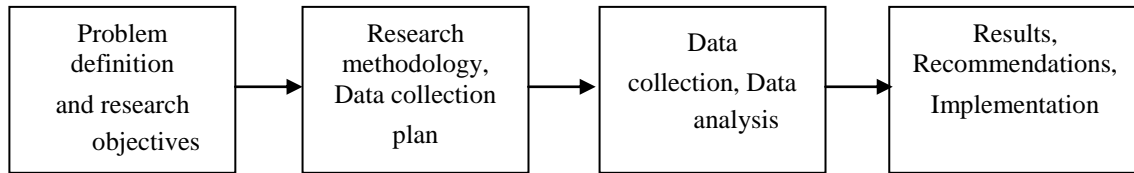
Fig. 2.6 Steps needed in online research.

Steps in Collecting Market Research Data :-

1. Define the research issue and the target market.
2. Identify newsgroups and Internet communities to study.
3. Identify specific topics for discussion.
4. Subscribe to the pertinent groups; register in communities
5. Search discussion group topic and content lists to find the target market.
6. Search e-mail discussion group lists.
7. Subscribe to filtering services that monitor groups.
8. Enter chat rooms, whenever possible.

Content of the Research Instrument:-

1. Post strategic queries to groups.
2. Post surveys on your website. Offer rewards for participation.
3. Post strategic queries on your website.
4. Post relevant content to groups with a pointer to your website survey.
5. Post a detailed survey in special e-mail questionnaires.
6. Create a chat room and try to build a community of consumers.

Target Audience of the Study:-

1. Compare your audience with the target population.
2. Determine your editorial focus.
3. Determine your content.
4. Determine what Web services to create.

Responses can be validated as they are entered, and other elements can be added to the questionnaire, such as graphics, logos, and links to other Web pages. Also, data re-entry errors are eliminated and statistical analyses can be done in minutes.

Data from prospective participants can also be collected across international borders. In addition, the participants have the flexibility of responding at any time, at their own convenience. Real-time information and reporting can also be accomplished.

Tracking Customer Movements on the Internet

Through the Internet, it is possible to learn about customers by observing their behaviour on the Internet rather than interacting with them and posing questions to them.

Many marketers keep track of consumers Web movements using cookie files attached to a user's browser to help track a Web surfer's movements online, whether or not consumers are aware of it.

Limitations of Online Research

Online research is not suitable for every client or product. Although the Web-user demography (i.e. Statistically Studying) is rapidly diversifying (i.e. vary range of products), it is still skewed (i.e. sudden change the direction) towards certain population groups, such as those with Internet access.

If a company manufactures a consumer product such as laundry detergent. Internet research may not be an ideal research tool, because it may not reach enough of the company's target market which in this case may be uneducated women in Indian villages.

Building Customer Relationship Based on One-to-One Marketing

One-to-one marketing is a type of relationship marketing. Relationship marketing is the overt attempt of exchange partners to build a long-term association, characterized by purposeful cooperation and mutual dependence on the development of social as well as structural bonds. It includes the concepts of loyalty or support and trust.

To be a genuine one-to-one marketer, a company must be able and willing to change its behaviour towards an individual customer based on what they know about that customer. So, one-to-one marketing is really a simple idea--"Treat different customers differently." It is based on the fact that no two customers are alike.

One-to-one marketing involves much more than just sales and marketing, because a firm must be able to change how its products are configured or its services are delivered based on the needs of individual customers. Smart companies have always encouraged the active participation of customers in the development of products, services, and

solutions. For the most part, however, being customer oriented has always meant being oriented to the needs of the typical customer in the market--the average customer. But in order to build enduring one-to-one relationships, a company must continuously interact with customers and address their needs individually.

The actual, detailed mechanics of building a one-to-one relationship depends on understanding the various ways in which customers are different and how these differences should affect the firm's behaviour towards particular, individual customers. One reason so many firms are beginning to focus on one-to-one marketing is that this kind of marketing can create high customer loyalty and, as a part of the process, help a firm's profitability.

A company increases loyalty in its own customers--one customer at a time—by establishing a learning relationship with each customer, starting with the most valuable customers. Think of a learning relationship as a relationship that gets better with every new interaction.

A customer tells a company of some need (or they learn about it otherwise), and the company customizes its product or service to meet this need. With each interaction and re-customization, the company better fits its product to this particular customer. Thus, the company makes the product more valuable to this customer. Then the customer is more likely to remain loyal to the company.

One of the benefits of doing business over the Internet is that it enables companies to better understand their customers' needs and buying habits, which in turn enables them to improve and frequently customize their future marketing efforts.

Market Segmentation:-

For years, companies used direct mail to contact customers. However, they did it regardless of whether the products or services were appropriate for the individuals on the company's mailing list. The cost of the direct mailings was about $1 per customer, and only 1 to 3 per cent responded. This meant that the cost per responding customer was between $33 and $100. Obviously, this type of direct marketing was not cost-effective.

In segmentation, the company breaks thousands of customers into smaller demographic segments and tailors its campaigns to each of those segments. Segmentation is done with the aid of tools such as data modeling, warehousing, and mining. Using data

mining and Web mining, businesses can look at consumer buying patterns to slice segments even finer.

Unfortunately, this is not an easy process, and it requires considerable resources and computer support. Most of the segmentation success stories involve large companies. For example, Royal Bank of Canada segments its 10 million customers at least once a month to determine credit risk, profitability, and so on.

Their segmentation is very successful. The response to Royal Bank of Canada's advertising campaigns has increased from 3 to 30 per cent. Segmentation is less expensive than one-to-one personalization.

It is also easier to obtain and maintain the necessary data. Segmentation is important when the Internet goes for localization for advertisement, especially in India with so many different states and languages. See Table 4.6.

TABLE 2.6

CONSUMER MARKET SEGMENTATION IN INDIA

Segmentation	Bases/Descriptors
Geographic	Region and states Size of state, city, district, village Statistical area Population density Climate
Demographic	Age Occupation Sex Education Family size Religion Family life cycle Caste Income Linguistic groups
Psychosocial	Social classes Lifestyles Personality
Cognitive, Affective, Behavioural	Attitudes Benefits sought Loyalty status Readiness stage Usage rate Perceived risk User status Innovativeness Usage situation Involvement

Problems of Internet Marketing in India

Internet marketing is now focused on urban and educated middle class population. To understand the growth of Internet users in India. We need to channelize the numbers appropriately by addressing the issue of "Who is an Internet user in India?"

A typical Internet user in an Indian household is a male student who is studying in graduation/post graduation and is aged between 19–25 years. Only 12 per cent of the Internet users are traders/businessmen, which is probably explained by the low level of web enablement of retailers in India.

Further only 4 per cent of the Internet users are housewives; this is a potential segment that can be tapped by the family product segment using the Internet.

The Internet is being used for varied purposes. Surveys have been conducted to determine the most important reasons for using the Internet. Table 2.7 is a representation of the varied uses of the Internet in India.

TABLE 2.7

USE OF INTERNET IN INDIA

Used for	*% of users*	*% of time*
E-mail	90	35
Information	50	9
Chat	43	9
Education Academic Info	41	11
Downloads	38	6
Music/Movies/Entertainment	27	4
Jobs	23	4

Educational and Age Profiles of Users? The educational and age profiles of users in India are observed as shown in Figure 2.7 and Table 2.8 respectively.[8]
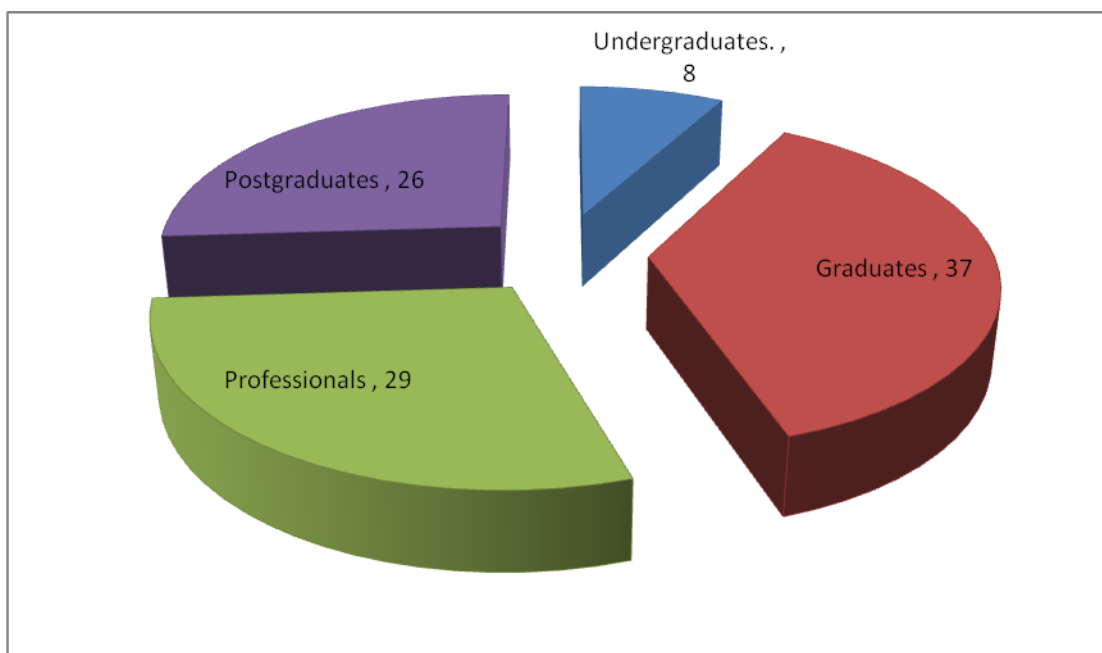
Fig. 2.7 Educational profile of users.

TABLE 2.8

AGE PROFILE OF INTERNET USERS IN INDIA

Age	Users (%)
15-20	25
21-25	29
26–30	14
30+	32

Gender

Currently, the Internet use has been found to be male dominant.

Gender	*% of users*
Male	76
Female	24

Points of Access

Regarding the region-wise distribution within India, more than two-thirds of the Indian Internet users are found to be in 6 cities. See Table 2.9.

- Delhi
- Mumbai
- Bangalore
- Hyderabad
- Chennai
- Pune

TABLE 2.9

POINTS OF ACCESS FOR INTERNET IN INDIA

Internet accessed from	% on a working day	% on a holiday
Home	25	47
Cyber Cafe	30	27
Work	29	07
Others	16	19

Considering the trends in the Indian market, it can be concluded from the rate of growth of Internet and computer usage that India has the potential to grow even more in this field and finally emerge as one of the countries with an exceptionally high computer and Internet user population.

However, right now, Internet marketing and advertising is very minimal; limited to a small segment of the population.

Data Mining and Marketing Research

Customer data accumulates daily in an ever-increasing quantity. Large companies such as retailers, telecommunication companies, PC makers, and car manufacturers build large data warehouses to store such information. To sift through the large amounts of data (e.g., in order to analyze buying habits), marketers use data mining tools.

Data mining derives its name from the similarities between searching for valuable business information in a large database and mining a mountain for a vein of valuable ore (i.e. valuable/profitable mineral from mine). Both processes require either sifting (i.e. making separate or isolate) through an immense amount of material or intelligently probing it to find exactly where the value resides. Given databases of sufficient size and quality, data mining technology can generate new business opportunities by providing these capabilities.

- *A*utomated prediction of trends and behaviors. Data mining automates the process of finding predictive information in large databases. Questions that traditionally required extensive hands-on analysis can now be answered directly and quickly from the data.
- *Automated discovery of previously unknown patterns.* Data mining tools identify previously hidden patterns. An example of patter discovery is the analysis of retail sales data to identify seemingly unrelated products that are often purchased together, such as baby diapers and beer. Other pattern discovery problems include detecting fraudulent credit card transactions and identifying anomalous data that may represent data entry keying errors.

The following are the major characteristics and objectives of data mining:
1. Relevant data are often difficult to locate in very large databases.
2. In some cases, the data are consolidated in data warehouses and data marts; in others, they are kept in databases or in Internet and intranet servers. Data mining tools help remove the information buried in corporate files or archived in public records.
3. "The "miner" is often an end-user empowered by "data drills" and other power query
4. Tools to ask ad hoc questions and get answers quickly, with little or no programming kills.
5. "Striking it rich" often involves finding unexpected, valuable results.
6. Data mining tools are easily combined with spreadsheets and other end-user software development tools; therefore, the mined data can he analyzed and processed quickly and easily.
7. Data mining yields five types of information: (a) association, (b)Sequences, (c) Classifications, (d) Clusters, and (e) Forecasting.

Data miners can use several tools and techniques. The most well-known tools of data mining are:
- **Neural computing.** Neural computing is a machine learning approach by which historical data can be examined for patterns. Users equipped with neural computing tools can go through huge databases and, for example, identify potential customers for a new product or search for companies whose profiles suggest that they are headed for bankruptcy.

- ***Intelligent agents.*** One of the most promising approaches to retrieving information from the Internet or from intranet-based databases is through the use of intelligent agents.

- ***Association analysis***. This approach uses a specialized set of algorithms that sorts through large data sets and expresses statistical rules among items.

Data mining can also be used to analyze websites. Web mining is the application of data mining techniques to discover actionable and meaningful patterns, profiles, and trends from Web resources.

The term Web mining is being used in two different ways. The first, Web content mining, is very similar to text mining. It is the process of information discovery from millions of Web documents.

The second, Web usage mining, is the process of analyzing Web access logs (or other information connected to user browsing and access patterns) on one or more Web localities. Table 2.10 shows various industries where data mining can be used.

TABLE 2.10

DATA MINING APPLICATIONS

Industry	*Applications*
Retailing and sales distribution	Predicting sales, determining inventory levels and schedules.
Banking	Forecasting levels of bad loans and fraudulent credit card use, predicting credit card spending by new customers, predicting .customer response to offers.
Airlines	Capturing data on where customers are flying and the ultimate destination of passengers who change carriers in mid-flight; thus, airlines can identify popular locations that they do not service and check the feasibility of adding routes to capture lost business.
Broadcasting	Predicting what is best to air during prime time and how to maximize returns by interjecting advertisements.
Marketing	Classifying customer demographics that can be used to predict which customers will respond to a mailing or buy a particular product.

Intelligent Agents in Marketing and Customer-related Applications

As the number of customers, products, vendors, and information increases, it becomes uneconomical, or even impossible, to match customers and products and consider all relevant information. The practical solution to handle the information overload is to use intelligent and software agents.

Agents are used to support many tasks. One of the primary reasons for using such agents is to overcome the tremendous amount of information overload. When going through the purchasing decision process described earlier, for example, a customer must examine large numbers of alternatives, each of which is surrounded by considerable amounts of information.

A search engine is a computer program that can automatically contact other network resources on the Internet, search for specific information or keywords, and report the results. This type of request is repetitive, and answering such requests is costly when done by a human. Search engines deliver answers economically and efficiently by matching questions with FAQ templates, which include standard questions and "canned' answers to them.

Unlike search engines, an intelligent agent can do more than just "search and E-match." For example, it can monitor movement on a website to check whether a customer seems lost or ventures into areas that may not fit his or her profile, and the agent can notify the customer and provide assistance. Depending on their level of intelligence, agents can do many other things, some of which are demonstrated here. Of the many agent applications, we cover only several representative ones. See Figure 2.8.
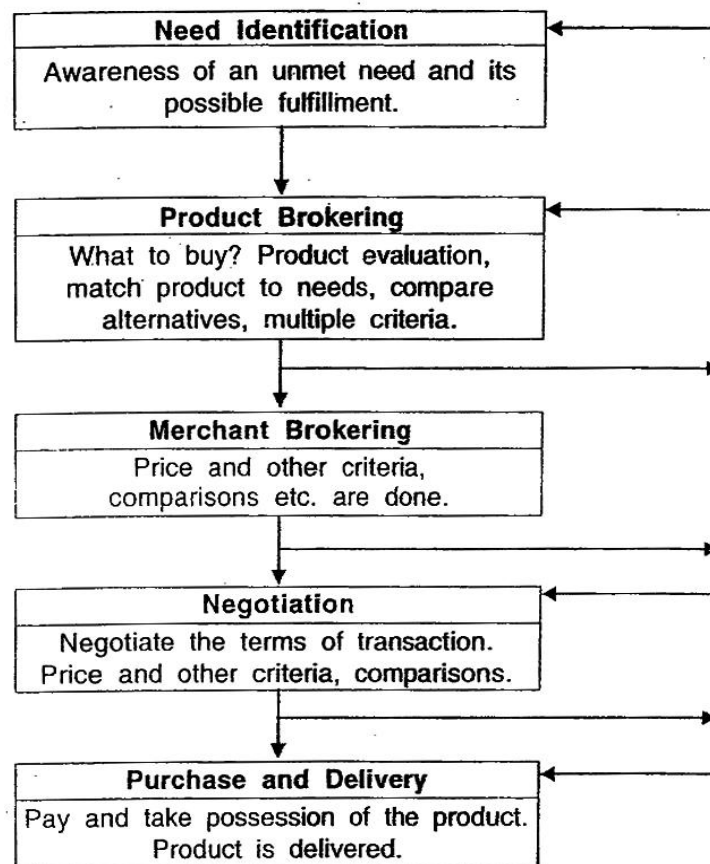

Fig. 2.8 Agent-purchasing.

Need Identification

Agents can assist the buyer with need identification by providing product information and stimuli. For example, *amazon.com* provides its customers with an agent that continuously monitors sets of data (such as the arrival of new books) and notifies customers when a book in their area of interest arrives. Similar agents watch for stocks to go below or above a certain level, sending the customer an e-mail when that level is reached. *Expedia.com* notifies customers about low airfares to a customer's desired destination whenever they become available.

Product Brokering

Once a need is established, customers search for a product (or service) that will satisfy this need. Several agents are available to assist customers with this task.

The pioneering agent in this category was firefly (a person with bright ideas). This agent, which was purchased by Microsoft and is no longer available independently, initially helped users find music they were likely to enjoy. Firefly (and similar agents) uses a collaborative filtering process to build profiles of people will visit a website.

Firefly provided works with a tool that identified them when they visited sites participating in the Firefly program and recommended product*s/* services to them. Based on people's likes (favourite movies, music, interests), Firefly helped marketers predict what customers were likely to want next. This allowed marketers to reach out to consumers with a customized pitch that was cheaper and more effective than mass advertising. It made product recommendations based on the prioritization of attributes, such as price and delivery time, by users.

Merchant Brokering

Once a customer knows what product he or she wants, the customer needs to find *where* to buy it. Bargain Finder (from Andersen Consulting) was the pioneering agent in this category.

The agent, used in online CD shopping, queried the price of a specific CD from a number of online vendors and returned a list of prices. However, this system has encountered problems because vendors who do not want to compete on price only have managed to block out the agent's requests.

Negotiation

The concept of "market" implies negotiation, mostly about prices. In B2B transactions, negotiation is very common. The benefit of dynamically negotiating a price is that the decision is shifted from the seller to the marketplace. In a fixed-price situation, if the seller fixes a price that is too high, sales will suffer. If the price is set too low, profits will be lower. Electronic support of negotiation can be extremely useful.

Kasbah also uses intelligent agents in the negotiation process. Kasbah agents *(kasbah.com)* can negotiate with each other following specific strategies assigned by their creators. However, this agent's usefulness is limited by the fact that price is the only parameter considered.

Agents can negotiate in pairs, or one agent can negotiate for a buyer with several sellers' agents. In such a case, the contact is done with each seller's agent individually, but the buyer's agent can conduct comparisons.

Purchase and Delivery

Agents are used extensively during the actual purchase, including arranging payment and delivery with the customer. For example, if a customer makes a mistake when completing an electronic order form, an agent will point it out immediately.

When customers buy stocks, for example, the agent will tell the customers when a stock they want to buy on margin is not marginable, or when the customer does not have sufficient funds. Delivery options at *amazon.com*, for example, are posted by agents and the total cost is calculated in real-time..

Measuring the Effectiveness of E-advertising

As more companies rely on their websites to make a favourable impression on potential customers, the issue of measuring website effectiveness has become important.

Mass media efforts are measured by estimates of audience size, circulation, or number of addressees. When a company purchases mass-media advertising, it pays à dollar amount for each thousand persons in the estimated audience.

This pricing metric is called cost per thousand or cost per metric, and is often abbreviated as CPM in short for cost per thousand impressions.

In reality, measuring Web audiences is more complicated because of the Web's interactivity and also because the value of a visitor to an advertiser depends on how much

information the site gathers from the visitor (for example, name, address, e-mail address, telephone number, and other demographic data).

Since each visitor voluntarily provides or refuses to provide these bits of information, all visitors are not of equal value. Internet advertisers have developed some web-specific metrics, described in this section, for site act*i*vity, but these are not generally accepted and are currently the subject of debate.

When a visitor requests a page from the website, it is counted as one visit. Further page loads from the same site are counted as part of the visit for a specific period of time.

This period of time is chosen by the administrators of the site and is dependent on the type of the site. A site that features stock quotes, might use a short time period, because visitors may load the page to check the price of one stock, and reload the page 15 minutes later to check another stock's price.

A museum site would expect a visitor to load multiple pages over a longer time period during a visit, and would use a longer visit time window. The first time a particular visitor loads a website page is called *a trial visit*; subsequent page loads are called *repeat visits*. Each page loaded by a visitor counts as a page view.

If the page contains an ad, the page load is called an *ad vie*w. Some Web pages have banner ads that continue to load and reload as long as the page is open in the visitor's web browser. Each time the banner ad loads is called an *impression,* and if the visitor clicks the banner ad to open the advertiser's page, that action is called a click, or a *click-through.* Banner ads are often sold on a cost per thousand impressions or CPM basis.

Rates vary greatly and depend on how much demographic information the website obtains about its visitors, but most are within the range of $1 to $100 CPM.

One of the most difficult things for companies to do as they move on to the Web is to determine the costs and benefits of advertising on the Web. Many companies are experimenting with new metrics they have created that consider the number of desired outcomes that their advertising yields.

For example, instead of comparing the number of click-through that companies obtain per dollar of advertising, they measure the number of new visitors to their site that buy for the first time after arriving at the site via a click-through. They can then calculate the advertising cost of acquiring one customer on the Web and compare it to the cost of acquiring one customer through traditional channels.

Internet Marketing Trends:

Technology-enabled Relationship Management

The nature of the Web, with its two-way communication features and traceable connection technology, allows firms to gather much more information about customers' behaviour arid preferences than they can using micro-marketing approaches.

Now, companies can measure a large number of things that are happening as customers and potential customers gather information and make purchase decisions. The idea of technology-enabled relationship management has become possible when promoting and selling via the Web.

Technology-enabled relationship management occurs when a firm obtains detailed information about a customer's behaviour. Preferences, needs, and buying patterns and uses that information to set prices negotiates terms, tailor promotions, add product features, and otherwise customize its entire relationship with that customer.

Although companies can use technology-enabled relationship management concepts to help manage relationships with vendors, employees, and other stakeholders, most companies currently use these concepts to manage customer relationships.

Thus, technology enabled relationship management is often called Customer Relationship Management (CRM) or Electronic-Customer Relationship Management (E-CRM). Table 2.11 compares technology enabled relationship management with traditional seller-customer interactions in seven dimensions.

TABLE 2.11

E-CRM VS CRM

Dimensions	Technology-enabled relationship management (E-CRM)	Traditional relationships with customers (CRM)
Advertising	Provide information in response to specific customer inquiries	"Push and sell" a uniform message to all customers
Targeting	Identifying and responding to specific customer behaviors and preferences.	Market segmentation
Promotions anddiscounts offered	Individually tailored to customer	Same for all customers
Distribution channels	Direct or through intermediaries; customer's choice	Through intermediaries chosen by the seller
Pricing of products or services	Negotiated with each customer	Set by the seller for all customers
New product	Created in response to customer	Determined by the seller

features	demands	based on research and development
Measurements used to manage the customer relationship	Customer retention: total value of the individual customer relationship	Market share: profit

Successful, new Web-marketing approaches involve enabling the potential customer to find information easily and to customize the depth and nature of that information, and encourages the customer to buy.

Firms should track and examine the behaviours of their website visitors, and then use that information to provide customize, value-added digital products and services in the market space. Companies that use these technology-enabled relationship management tools to improve their contact with customers will be more successful on the Web, than firms that adapt advertising and promotion strategies that were successful in the physical world but that are less effective in the virtual world.

The results of a survey of global chief executive officers indicate significant Internet growth and business usage over the next five years, with 92 per cent of executives projecting revenues derived from e-commerce.

Although the information technology that supports electronic marketing currently accounts for just 8 per cent of the United States' total economic output, over the last five years, it has fuelled more than one-third of economic growth in the United States. The remarkable growth and impact of the Internet and World Wide Web have spurred almost every business to explore e-marketing strategies to enrich relationships with customers, employees, and suppliers. In fact, the characteristics and availability of the e-commerce infrastructure are driving strategic planning.

Target Markets

Marketing strategy involves identifying and analyzing a target market and creating a marketing atmosphere that satisfies the individuals in that market. Increasingly, marketers are reaching those individuals through the Internet. Currently, about 110 million Americans access the Internet either at home or at work. Although Internet access outside the US has lagged behind in usage, people around the world are rapidly discovering the Web's potential for communication and e-marketing. Internet use by consumers in other countries-especially Japan (26.9 million users), Germany (19.1

million), the United Kingdom (17.9 million), China (15.8 million), and Canada (13.28 million)—is escalating rapidly..

Although men have long dominated Internet usage statistics, women are using the Internet for work and to simplify their lives, especially to save time and money. There are 27 million women online in the US, about 46 per cent of American Internet users, but some experts predict that women would have outnumbered men (60 per cent to 40 per cent) on the Internet by 2002.

Women are also shopping online -53 per cent of women visitors make online purchase. Internet access by American minority groups is also increasing, with 6.9 million Hispanics, 4.9 million blacks, and 4 million Asians online today.

Marketers are also interested in the increasing use of the Internet by teenagers and seniors over the age of 55 years. The 11 million American teenagers using the Internet, spent $161 million online this year, and experts project that their numbers will reach 15.3 million and $1.4 billion in 2002.

Seniors spent $3.5 billion online this year and are projected to reach $16.7 billion in online spending by 2002. Such important target markets booming with Internet use, more and more companies are finding market opportunities online.

Product Considerations

The exponential growth of the Internet and the World Wide Web presents significant opportunities for marketing products to both organizations and consumers. Through e-marketing strategies, companies can provide products, including goods, services, and ideas, that offer unique benefits and improve customer satisfaction.

Computers and computer peripherals, industrial supplies, and packaged software are the leading organizational purchases online. Consumer products account for a small but growing percentage of Internet transactions, with securities trading, travel/tourism, and books among the hottest consumer purchases.

The online marketing of goods such as computer hardware and software, books, videos, CDs, toys, automobiles, and even groceries is accelerating rapidly. Ideas such as marriage counselling, medical advice, tax/legal advice, and even psychic services, are being successfully marketed online as well.

Services may have the greatest potential for online marketing success. Many websites have sprung up to offer or enhance services ranging from home and car-buying-

assistance to grocery shopping and travel reservations, and in the travel industry, for example, the ease and relatively low cost of booking travel arrangements online has fuelled online ticket sales, with bookings increasing from $276,000 in 1996 to $1.9 million in 1998. They are projected to reach $8.9 million by 2002.

E-branding

A known and respected brand name can present to potential customers, a powerful statement of quality value and other desirable qualities in one recognizable element. Branded products are easier to advertise and promote, because each product carries the reputation of the brand name.

Companies have developed and nurtured their branding programmes in the physical marketplace for many years. Consumer brands such as Ivory soap, Walt Disney entertainment, Maytag appliances, and Ford automobiles have been developed over many years with the expenditure of tremendous amounts of money. However, the value of these and other trusted major brands far exceeds the cost of creating them.

Elements of Branding

The key elements of a brand are differentiation, relevance, and perceived value. Product differentiation is the first condition that must be met with to create a product or a service brand. The company must clearly distinguish its product from all others in the market. This makes branding for products such as salt, nails, or plywood difficult, but not impossible.

If a brand has established that it is different from competing brands and that it is relevant, and inspires a perception of value to potential purchasers, those purchasers will buy the product and become familiar with how it provides value. Brands become established only when they reach this level of purchaser-understanding.

In traditional marketing, "branding" campaigns are designed to embed a company or a product name in your consumer psyche. Firms often use a combination of persuasive, emotional advertising campaigns and public relations to encourage a link between a positive "feeling" and a product. If it works, it can make you want to spend your hard-earned money as fast as possible. Online companies are putting branding to work with remarkable success. Research shows the brand names of seven Internet companies are already recognized by more than 50 million US adults, giving them 'mega-brand' status.

According to Opinion Research Corporation International, the following Internet names are top-of-mind with Americans: America Online, Yahoo!, Netscape, *amazon.com, Priceline.com, Infoseek*, and Excite. Intelliquest a national computing survey was conducted a research and asked 10,000 randomly selected Internet users (unaided by a list of possibilities) to name the sites they associate with certain products. Following is the result

- **Books: Amazon.com (56%).**
- **Music: CDNow (24%)**
- Computer **Software: Microsoft (30%)**.
- Computer **Hardware**: Dell (20%) .
- Clothing: The Gap (12%).
- Travel: AOL, Yahoo!, Travelocity (each 8%)
- Autos: Yahoo! (6%)

This clearly shows the effect that e-branding has on the psyche of the consumer. This e-branding criteria is summarized in Table 2.12..

TABLE 2.12

E-BRANDING CRITERIA

Element	*Meaning to the customer*
Differentiation	In what significant ways is this product or service unlike its competitors*?*
Relevance	How does this product or service fit into my life?
Perceived value	Is this product or service good*?*

However, a debate still rages in the business departments of many Internet companies over the importance of branding. How much effort should they spend on e-branding initiatives, that is, building up an online brand? Will those resources be better spent promoting e-commerce efforts which offer tangible returns*?*

Spiral Branding

The Internet does indeed open new possibilities and new dangers for anyone who ignores the signs. The advent of Internet sites and mailings make possible a new form of marketing called s*piral branding.*

There are two reasons. First, as consumers, it pays to be aware of the tactics marketers are using to influence us. Second, many of us will need to understand and use these techniques ourselves, in our own businesses.

The word "spiral" describes the accelerating benefits of a positive feedback loop: Bill Gates, for instance, often talks about the upward spiral of his Windows business. Since there are more software, customers purchase more Windows machines and since there are more customers, developers build more software which attract more customers. And so goes the cycle.

Savvy (Able Marketers with good judgment of market) marketers use these concepts to create a three-stage branding spiral. First, you use television, print or radio to attract people's attention and send them to the Web.

Second, you use the Web to get those customers take interest (via specialized content and interactive services) in your products. You also collect their e-mail addresses. Third, you use e-mail to remind and induce them to return to the Web again. E-mail closes the loop and takes people around the spiral again.

The keys to spiral branding are:

1. Use each media for its best purpose (for instance, don't try to create a television experience on the Web).
2. Do it fast (get something up now and fine-tune as you go along).
3. Iterate constantly (make improvements each time around the spiral).

Branding is about controlling the free-association game to your advantage; building an e-commerce powerhouse may be a company's stated objective, but it will not get far unless it puts e-branding first.

The Internet is transforming customer buying behaviour, with major consequences for how the new breed of consumer develops familiarity with, and ultimately loyalty to, the brand. Marketers who strive to capitalize on these shifts—as all successful marketers must do—will have to better align their branding investments with new data about how customers shop and buy online. Only by strategically recomposing the marketing mix can marketers drive traffic, build brand equity and capture customer loyalty in the Internet age.

While print, television, radio and related marketing vehicles are hardly superfluous, the data does suggest that "old media" investments will be less effective in

building visibility and brand equity over the Web than a range of alternative programs and tools that better align with online customer buying behaviour.

Successful marketers (i.e. people who sell goods in market) will experiment with these emerging strategies to reach out to and connect with their Web-savvy constituents. The following strategies appear particularly promising:

Search Engine Optimization

With nearly half of all Web users citing search engines as their primary portals to new sites, marketers must re-examine their strategies for optimizing their rankings in search results. Appearing among the first few pages of search results on the top search engines is a black magic science practiced by (usually expensive) outsourcers who specialize in the real-time adjustments that are the key to maximizing visibility on search engines.

Affiliate Networks

Online marketers need to carefully plan and manage partner programs that give them a broad reach of links on affiliate sites across the internet. Where 20 per cent of Web users cite "random surfing" as their top means of finding new sites, marketers must have extensive links in place, to maximize their reach to customers throughout the Internet.

So-called "affiliate networks"—which typically reward referring to sites with a commission or bounty based on click-through, sales leads or completed transactions are generally much more cost-effective than standard cost-per-thousand banner campaigns.

Advocacy Marketing

Often the most powerful recommendation for a company is that of a satisfied customer to a friend. With 20 per cent of surfers citing word of mouth from friends as their top means of finding new sites, companies need to provide incentives (e.g. discounts, loyalty currencies) and simple mechanisms (e.g. Web-based e-mail forms, pass-along e-mail newsletters) to enlist their customers as marketing advocates to their friends—a strategy often referred to as "viral marketing" by online marketers.

Permission E-mail

When customers explicitly opt into permission marketing relationships, e-mail can be one of the most cost-effective and brand-positive means of acquiring new customers and remarketing to existing customers.

Savvy Internet marketers have realized that "e-mail marketing" does not need to be synonymous with "spam". Instead, a range of strategies **s**uch as customer relationship e-mail, corporate e-mail newsletters, reminder services, permission networks, sponsored independent newsletters, discussion lists, and partner co-marketing can drive online traffic and enhance brand equity.

Personalization and Mass Customization

Marketers can dramatically enhance customers' online experience by personalizing their Web presence and allowing customers to configure products and services (enabled by mass customized back-end processes).

Sites can improve customer loyalty and build exit barriers with services such as personalized customer interfaces, behaviour-based recommendations and individual product configuration. Personalization is the very essence of experiential branding, whereby customers impact a product or service to reflect a bit of themselves through a one-to-one interaction with the brand.

E-care

A key component of any brand experience is the quality of customer service and support. While companies have long striven for customer service excellence in the offline environment, they are finding that customer expectations for online service present many unfamiliar challenges, such as managing a torrent of customer e-mail inquiries and enabling efficient self-service knowledge bases.

With the proper allocation of resources, however, companies can experience bran 1-positive efficiencies, delivering quality customer service more efficiently online than through traditional channels. Companies that disappoint the user's expectations, however, will damage their online brand equity.

Conventional offline branding is a promise, a relationship built over time, across a wide range of media, gradually giving customers and would-be customers an impression of the organization and an expectation of its products or services.

E-branding is immediate. It is not based on the promise; it is based on that dynamic flow of information or the transaction at hand. E-branding is the experience of the words, images, and applications available on your site.

Creating the experience is creating what you wish users to feel and think about you, as they operate quite independently from one on the digital frontier (i.e. separating boundary). The experience, then, is your brand.

While existing brand equity can be brought to the online experience by your customers, it can be destroyed in an instant through a negative interaction with your website, banner ad, or multimedia presentation.

Marketing Strategies

Permission-marketing Strategies

Many businesses would like to send e-mail messages to their customers and potential customers to announce new products, new product features, or sales on existing products.

However, print and broadcast journalists have severely criticized some companies for sending e-mail messages to customers or potential customers. Some companies have even faced legal action after sending out mass e-mails. Unsolicited e-mail (i.e. voluntarily or not called email) is often considered to be a spam.

Many businesses are finding that they can maintain an effective dialogue with their customers by using automated e-mail communications.

Sending one e-mail message to a customer can cost less than one cent if the company already has the customer's e-mail address. Purchasing the e-mail addresses of persons who have asked to receive specific kinds of e-mail messages will add between a few cents and a dollar 10 the cost of each message sent.

Another factor to consider is the conversion rate. The conversion rate of an advertising method is the percentage of recipients who respond to an ad or promotion. Conversion rates on requested e-mail messages range from 10 per cent 10 over 30 per cent. These are much higher than the click-through rates on banner ads, which are currently under 1% percent and decreasing.

The practice of sending e-mail messages to people who have requested information on a particular topic or about a specific product is called opt-in e-mail and is

part of a marketing strategy called *permission-marketing*. Thus, a marketing strategy that only sends specific information to persons who have indicated an interest in receiving information about the product or service being promoted should be more successful than a marketing strategy that sends general promotional messages through the mass media. One website that offers opt-in e-mail services is y*esmail.com.*

To induce potential customers to accept or opt in to advertising information sent via e-mail messages, the seller must provide some incentive.

This incentive could be entertainment, a chance to win a prize, or even a direct cash payment. For example, *AllAdvantage.c*om is a company that pays web users for permission to monitor their web surfing activities.

After tracking these users, *AllAdvantage.com* presents targeted ads to them. Advertisers are willing to pay a premium to have access to persons who have demonstrated by their web surfing habits that they are interested in the products or services offered by the advertiser

Brand-leveraging Strategies

Rational branding is not the only way to build brands on the Web. One method there working for well-established websites is to extend their dominant positions to other are and services. Yahoo! is an excellent example of this strategy. Yahoo! was one of directories on the Web.

It added a search engine function early in its development and has continued to parlay (i.e. winning from previous bet) its leading position by acquiring other Web businesses and expanding existing offerings.

Then, Yahoo! acquired *GeoCities a*nd *Broadcast.co*m, and entered into an extensive cross-promotion partnership with a number of Fox entertainment and media Yahoo! continues to lead its two nearest competitors, Excite and Infoseek, in ad revenue by adding futures that Web users find useful and that increase the site's value to advertisers. Am*azon.com*'s expansion from its original book business into CDs, videos, and auctions is another example of a website leveraging its dominant position by adding features of existing customers.

Affiliate-marketing Strategies

Of course, this leveraging approach only works for firms that already have website this dominate a particular market. *A*s the Web matures It will be increasingly difficult for new entrants (i.e. a group of participants) and attain dominance. A tool that many new, entrants to identify unserved market segments and attain dominance.

A tool low-budget websites are using to generate revenue is affiliate marketing. In affiliate marketing, one firm's (the affiliate firm's) website includes descriptions, reviews, ratings, or other information about a product that is linked to another firm's site that offers the item for the For every visitor who follows a link from the affiliate's site to the seller's site, the affiliate

also obtains the benefit of the selling site's brand site receives a commission. The affiliate site also obtains the benefit of the sell in exchange for the referral.

One of the more interesting marketing tactics made possible by the Web is con marketing, which is an affiliate-marketing program that benefits a charitable organization (an*d* thus. Supports a "cause"). In cause marketing, the affiliate site is created to benefit the charitable organization.

When visitors click a link on the affiliate's Web page, a donation is made by a sponsoring company. The page that loads after the visitor clicks the donation link carries advertising for the sponsoring companies. Many companies have found that the line through rates on these ads are much higher than the typical banner ad click-through man A leading retail Web florist, *proflowers.com*, has had excellent results advertising on the *Hunger Sit*e p<u>age</u>.

When a visitor clicks the button on this page, a group of sponsoring advertisers donates food to a hungry person and a page appears in the visitor's browser with ads for the sponsors.

Viral-marketing Strategies

Traditional marketing strategies have always been developed with an assumption that the company was going to communicate with potential customers directly or through an intermediary that was acting on behalf of the company, such as a distributor, retailer, or independent sales organization. Since the Web expands the types of communication channels available, including customer-to-customer communication, another marketing

approach has become popular on the Web. Viral marketing relies on existing customers to tell other persons—the company's prospective customers—about the products or services they have enjoyed using.

Much as affiliate marketing uses websites to spread the word about a company, viral marketing approaches individual customers to do the same thing. The number of customers increases much as a virus multiplies, thus the name.

Website Naming Issues

Firms that have a major investment in branding a product or a service must protect that investment. In previous chapter, you learned about the security issues surrounding website naming.

The legal and marketing aspects of website naming can be very much complicated. Although a variety of state and federal laws protect trademarks, the procedure for creating and using website names that are not trademarks can present some challenging issues.

Obtaining identifiable names to use for branded products on the Web can be just as important as ensuring legal trademark protection for an existing brand investment.

In 1998, a poster art and framing company named *Artuframe* opened for business on the Web. With quality products and an appealing site design, the company was doing well, but it was concerned about its URL, which was www.*artuframe.com. A*fter searching for a more appropriate URL, the company's president found the website of Advanced *Rotocraft Technology*, an aerospace firm, at the URL www.*art.com*.

After finding out that Advanced *Rotocraft Technology's* site was drawing 150,000 visitors each month who were looking for something art-related, Artuframe offered to buy the URL.

The aerospace firm agreed to sell the URL to Artuframe for $450,000. Artuframe immediately changed its URL to *Art.com* and experienced a 30 per cent increase in site traffic, the day after implementing the name change.

The newly named site however, did not rely on the name change alone. It has since then entered a joint marketing agreement with Yahoo! that places an ad for A*rt.com* on art related search result pages. A*rt.com* has also created an affiliate program with businesses that sell art-related products and other organizations that have websites devoted to art-related topics.

Another company that invested in an appropriate URL was *Cars.com*. The firm paid $100,000 to the speculator who had originally purchased the rights for the URL. *Cars.com* is a themed-portal site that displays ads for new cars, used cars, financing, leasing, and other car-related products and services.

The major investors in this firm are newspaper publishers that wanted to retain an interest in automobile-related advertising as it moved online. Classified automobile ads are an important revenue source for many newspapers.

Table 4.13 lists domain names that have been sold for more than $1 million each..

TABLE 2.13

DOMAIN NAMES THAT WERE SOLD

Domain name	Price
Business.com	$7.5 million
Altavista.com	$3.3 million
Loans.com	$3.0 million
Wine.com	$3.0 million
Autos.com	$2.2 million
Express.com	$2.0 million
WallStreet.com	$1.0 million

Although most domains that have high value are dot-com sites, the name *engineering.org* sold at an auction to the American Society of Mechanical Engineers, a not-for-profit organization, for just under $200,000.

Several legitimate online businesses, known as URL brokers, are in the business of selling or auctioning domain names that they believe others will find valuable. Companies selling "good" (short and easily remembered) doma**in names** include *Domains.com, DomainRace.com, GreatDomains.com,* and *HitDomains.com. Unclaimed Domains* sells a subscription to lists of recently expired domain names that it publishes periodically, and the Netcraft website has a URL search function to search for words in URLs.

The Internet Corporation for Assigned Names and Numbers (ICANN) maintains a list of accredited domain name registrars, which are companies that have been authorized by ICANN to sell the rights to use specific domain names ending in com, pet, and org.

Advertising-supported Model

The advertising-supported business model is the one used by network television in the United States. Broadcasters provide free programming to the audience along with advertising messages.

The advertising revenue is sufficient to support the operations of the network and the creation or purchase of the programs.

Many observers of the Web in its early growth period believed that the potential for Internet advertising was tremendous. However, after a few years of experience trying to develop profitable advertising-supported business models, many of those observers are less optimistic.

The success of Web advertising has been hampered by two major problems. First, as discussed earlier, no consensus has emerged on how to measure and charge for site visitor views.

Since the Web allows multiple measurements, such as of number of visitors, number of unique visitors, number of click-throughs, and other attributes of visitor behaviour, it has been difficult for web advertisers to develop a standard for advertising charges, such as the CPM measure used for mass-media outlets.

In addition to the number of visitors or page views, stickiness is a critical element for creating a presence that will attract advertisers. the stickiness of a website is its ability to keep visitors at the site and to attract repeat visitors. People spend more time at a sticky website and are thus exposed to more advertising.

The second problem is that very few websites have sufficient numbers of visitors to interest large advertisers. Most successful advertising on the Web is targeted to very specific groups. However, it can be difficult to determine whether a given website is attracting a specific market segment or not, unless that site collects demographic information, which the visitors are increasingly reluctant (i.e. unwillingly)to provide because of privacy concerns.

Only a few general-interest sites have generated sufficient traffic to be profitable based on advertising revenue alone. One of these is Yahoo!, which was one of the first Web directories. Many people use Yahoo! as a starting point for searching the Web, and the number of visitors increase day by day. This has made it possible for Yahoo! to expand its Web directory into one of the first portal sites.

Because the Yahoo! portal's search engine presents visitors' search results on separate pages, it can include advertising on each results page that is triggered by the terms in the search. For example, when the Yahoo! search engine detects that a visitor has searched on the term "new car deals", it can place a Ford ad at the top of the search results page.

Ford is willing to pay more for this ad because it is directed only at visitors who have expressed interest in new cars. This example demonstrates one attractive option for identifying a target market audience without collecting demographic information from site visitors.

Unfortunately, only a few high-traffic sites are able to generate significant advertising revenues this way. Besides Yahoo!, the main portal sites in this market today are Excite, *Infoseek*, and *Lycos*.

Smaller general-interest sites, such as the Web directory *refdesk.com*, have had much more difficult than the larger search engine sites in attracting advertisers. This may change in the future as more people use the Web.

Newspaper publishers have experimented with various ways of establishing a profitable presence on the Web. It is unclear whether a newspaper's presence on the Web helps or hurts the newspaper's business as a whole.

Although it provides greater exposure for the newspaper's brand and a larger audience for advertising that the paper carries, it can also take away sales from the print edition, a process called *cannibalization.* Newspapers and other publishers worry about cannibalization (i.e. reduction of sales from company), because it is very difficult to measure.

Some publishers have conducted surveys in to find out whether people have stopped buying their favourite newspaper because the contents they want to see are available online, but the results of such surveys are not very reliable.

Many leading newspapers, including *The Washington Post* and *The Los Angeles Time*s*,* have established online presences in the hope that they will generate enough revenue to cover the cost of creating and maintaining the website. The **Internet Public Library Online Newspapers** page includes links to hundreds of newspaper sites around the world.

Although attempts to **create general**-interest websites that generate sufficient advertising revenue to be profitable have met with mixed results, sites that target niche

markets have been more successful. For newspapers, classified advertising is very profitable. Therefore, it is not a surprise t**hat websites which specialize in providing only cla**ssified advertising, have profi**t potential if they can reach a narrow enough target market.**

An implementation of the advertising-supported business model which appears to be successful is web employment advertising. Firms with websites such as *CareerSite.com* and *JOBTRAK* offer international distribution of employment ads.

As the number of people using the Web increases, these businesses will be able to move out of their current focus on technology and higher-level jobs and include advertising for all kinds of positions.

These sites can use the same approach that search engine sites use to offer advertisers target markets. When a visitor specifies an interest in, for example, engineering jobs in Dallas, the results page can include a targeted banner ad for which an advertiser will pay more, because it is directed at a specific segment of the audience.

Employment ad sites can also target specific categories of job seekers by including short articles on topics of interest. This will also ensure that qualified people, who are not necessarily looking for a job, keep coming back to the site; such people are the candidates most highly sought after by employers.

Marketing Strategy on the Web

Finally, it needs to be reiterated that strategy for marketing on the Internet should follow rules such as those given in Table 2.14.

TABLE 2.14

MARKETING STRATEGIES FOR THE WEB

Strategy	*Rules*
Brands	Your website becomes your most important brand.
Change	Keep in mind that the marketing rules on the Internet are constantly changing.
Conciseness	Keep your pages short, and spread information on several pages. Content is the king and so make it interesting.
Content Dynamic sites	Create dynamic sites that use new technologies to adapt information based on user profiles.
Finances Free	Try new markets with low advertising pricing schemes.

giveaways Global village Live events Niche markets Promotion Syndication Technology	Create free offerings for your loyal customers. Think global, but localize. Online events create quick awareness. The Internet is a series of niche markets and mass markets. Promote your site everywhere. Co-brand your services and products. Use Internet technology to maximize your marketing objectives.

The Times of India

Till 2002, The Times of India was just another newspaper competing to make its mark and increase its readership. But today, the newspaper has transformed from what was once a plain-looking national newspaper into a global one, which anybody in any part of the world can access with just a click of the mouse.

To put consumers, i.e. the readers, in the centre of the flagship media brand, The Times Group had hired a seasoned advertising strategy professional, Rahul Kansal, as Brand Director. The new position of Brand Director was to attempt to address the readers as consumers and a brand person' (and not just a content person-Editor) needs to constantly evolve the product offering.

When the TOI decided to revamp its brand image, it brought about a lot of changes to its paper as well as its online edition. The Internet hence played a very important role in its remodelling. They changed their page layout, broke the page up into different sections, added pictures to break the monotony, and then went online.

Now, how did going online help them? It integrated the hard copy of the newspaper with the online edition. They made the website a place where people came for more than just news. They introduced the following online features:

- Classified advertisements: There is an option of online search. Since there is no restriction like in the print, more ads can be accommodated. This is also integrated with the printed version.
- Hot links: They provide links to the e-paper that makes the local paper globally available for a subscription, and other favorite links like Bollywood, NRI news, etc.

- News items: Links to the regular sections of the newspaper are also provided, like India, sports, world, weather, entertainment, etc.
- Opinion section: In this section, the views of the various columnists, editor and people on the various current affairs are given.
- Online copies of all supplements.
- Online shopping, games, chats, e-mails.
- Lots of pictures and graphics to make it interesting.
- They also have links to other sites powered by the Times Group, thereby promoting those as well.

Advantages of the Online Edition

- Accessibility--People from Bangalore to Boston, Hyderabad to Houston can all have access to TOI.
- Hourly updates-Any breaking news can be easily found on the website, and people need not wait for the next morning.
- Caters to a wide range of interests and needs-Current affairs, finances, shopping, entertainment, astrology, travel bookings, etc.
- Platform to voice opinions-Opinion polls, letters to the editors, views of columnists and editor.
- Show customers that they too are modern and on par with the changing trends.
- Incorporate features that keep bringing people back to their site-offering the customer's more than just news.

All of this and more add up to the Brand- *the Times of India.*

Case Discussion

1. What are the advantages of having an internet version of the newspaper?
2. Visit the site of The Times of India and identify the difference between the internet version and the actual newspaper?
3. How does the marketing model fit into the internet version of the newspaper?

Rediff.com [10]

Founded in 1996, Rediff.com India Ltd., is one of India's leading Internet, communications and media companies, serving Indians globally, both online and offline.

Through its online and offline product and service offerings, Rediff.com offers interest specific channels, local language editions, sophisticated search capabilities, online shopping, long distance calling cards and Internet based telephony services.

Its news publication, India Abroad, is one of the oldest and largest South Asian weekly newspapers, serving the Indian American community in the United States. The Company also provides users extensive Internet community offerings, all tailored to the interests of Indians worldwide. Rediff.com has offices in New York, Chicago, New Delhi and is headquartered in Mumbai, India.[11]

At rediff.com, you can do almost anything that you would like to do on the Internet. You could...

- Communicate better.
- Find useful information
- Have fun
- Enhance your career
- Simplify routine work
- Plan your life
- Stay informed. Buy and sell

You can begin communicating by exploring any of the several ways in which rediff.com can help you communicate better.

- Send and receive e-mail
- Chat with people
- Send an instant message
- Send greetings
- Build your own home page
- Voice your opinions
- Send e-mail from your mobile

Rediffmail is a free e-mail service. Rediffmail also allows you to send e-mail in most Indian languages. E-cards or electronic cards are the Internet's version of regular paper greeting cards. E-cards can be sent to anyone with an e-mail address.

If you have strong opinions about issues at large, polls can serve to be the platform where you can have your say. Polls have proved to be very popular because they maintain your anonymity and at the same time help you compare your stand with the rest of the world.

A poll could be question based, where you will have to answer one or more questions. It could also be a statement, about which you can air your opinion.

One reason why the Internet has made the world come closer together is because it lets groups of people chat with each other in real time, no matter in which part of the world they might be.

Chat facilities are there in Rediff. The name of the room will usually give you an idea about what kind of discussions you will find going on inside. In the *Metropolis room*, you can make friends and communicate with people from different parts of the world.

You can now experience the power of the Internet on *your mobile phone too. M*ost of the communication between a mobile phone and the Internet can happen only if your handset supports a technology standard called WAP, short for 'wireless access protocol'.

Search Facilities:-

There is so much information on the Internet, that finding what you exactly want becomes very difficult. That is why, to get the most out of the Internet, it is crucial that you use the best search tools.

Here is how rediff.com makes it very simple to immediately find useful information...

- Search the Internet
- Search rediff.com
- Find financial information.
- Find hotels and flight schedules
- Locate wedding resources
- Land a dream job
- Find the right car

RediffSearch has one of the best search tools in the world. It has been designed to meet the needs of Indians worldwide. Rediff Travel can help you search for the hotels to suit your budget at your desired destination. *Y*ou can also find out about flight and train availability by using Rediff Air/Rail Information. For train availability, you can follow a link to a page that has a table of train schedules. For flight availability, there is a sophisticated tool that will first ask you some information about your journey. On the basis of what you have typed, it will let you know whether tickets are available.

Use the Internet to search for information related to jobs and career opportunities. This means that you no longer have to depend only upon placement agencies or go directly to the companies when you are job hunting. Rediff Jobs is a tool that helps you search a job that matches your skills. Using this tool you can.

- Search for jobs posted by companies on their websites
- Search, for jobs openings within your industry
- Search for useful tips that will increase your chances of getting a job

You can search a database of over 10,000 job openings by specifying the category and the city of your preference. If you are an employer, you can search through the resumes posted online to find a suitable candidate. You will need to register to use this service.

Here is how rediff.com tries to help you to plan your life.

- What the stars foretell.
- Manage your money.
- Pack your bags.
- Spice up your love life.
- Plan a perfect wedding.
- Improve your lifestyle.

All kinds of planning can be undone if your personal finances are in a mess.

Rediff Money covers the entire investment universe: stocks, mutual funds and banking, taxation, insurance, loans, credit cards, and real estate. You can find these under a subsection called 'personal finance'.

Rediff Romance offers you everything you ever wanted to know about love and romance. You can pick up some valuable love lessons about:

- Getting your first date

- Dealing with heartbreak

- Shyness

- Jealousy

- Gifting

- Long distance relationships.

News on Rediff...
- Get the latest news and views

- US edition keeps you in touch

- Read news in Indian languages.

- Keep track of money matters.

- Get the latest movie news.

- Catch the action.

- Keep abreast of tech advances.

- Catch sporting activities.

- Identify travel hotspots.

- Check out the hottest sites.

- Follow the weatherman.

- Step up your career.

- Track lifestyle trends.

- Stay informed on the go.

Rediff News publishes interviews, special features and reports. These cover local and national events in politics, business, entertainment and sports, especially cricket. It also features a cross-section of opinions through its galaxy of columnists.

There is a niche for photojournalism, and picture slide shows are a regular feature. Video and sound clips are also published.

Rediff Newsletters gives you the option of subscribing to several newsletters. These newsletters deliver the news via e-mail so that you do not have to visit the site all the time. News and events from around the world are now accessible to you in four Indian languages: Hindi, Tamil, Telugu and Gujarati. These language editions are not merely

translations of the Rediff News. They carry extensive features and news that would specifically interest Hindi, Tamil, Telugu and Gujarati readers.

Rediff Technology :-

Information here is neatly slotted into news, reviews, business and technology, help and how-to, Web life, Hindi zone, forum and events. You can also get access to new downloads, read breaking news and check out the Editor's Pick of the Day.

Rediff Sports brings to you the highlights of all major sporting activities from all over the world. You can catch the sporting action through interviews, columns, and slide shows.

However, cricket holds it prime position with a separate section for it. Rediff Cricket is the most popular cricket site in the world. It is famous for having pioneered live cricket commentary in a chat room. Also, here you can pick up details of the latest cricket tournaments. There is an international cricket schedule to keep track of the season.

You can read match reports, statistics, columns, interviews and articles. There are links to articles on other sites too. Besides, there is a photo gallery of cricket stars. You can also pose a question to an expert and participate in a daily poll.

Case Discussion

- How does the advertising model fit rediff.com?
- What are the other business models that can be applied to rediff.com?
- What is the source of success of rediff.com?
- What are the benefits derived from being a user of rediff mail?
- Why would rediff.com offer free e-mail?

EXERCISES:-

1. Describe the process of Internet shopping. List the major steps involved.
2. What is direct marketing?
3. List the critical success factors of Dell.
4. Why are books such a natural target for e-commerce?
5. List the major methods of Internet advertisement.
6. Compare banner swapping and banner exchange.
7. Compare and contrast 'pulling information' and 'pushing information'.

8. Discuss why banners are important in Internet advertisement.

9. How is the chat room used for advertisement?

10. Why might the use of CPM to charge advertisers be inappropriate as a basis for charting ads*?*

11. Why do customers like Web-based purchase? What cultural and social factors would affect Indian Web-based purchases?

12. Enter the sites www.*peapod.com*and www.*Netgrocer.com*.Compare the services offered by the two companies and evaluate their chances for success. If you had money to invest, in which of these two companies would you invest*?*

13. There are many search engines. Try the following ones: www.*jango.com*and www.*compare.com.* Try to find a Notebook computer, a vacuum cleaner and a plain paper fax machine and compare the prices. Comment on the strong and weak point of each of the search engines.

14. Almost all major car manufacturers allow you to configure your car online. Enter www.t*oyota.com*and www.*ford.com*and configure a car of your choice. After you decide what you want, examine the payment options.

15. Enter the website www.*ipro.com*and find what Internet traffic management, Web : results and auditing services are provided. What are the benefits of each*?*

16. Find information about banners in the following sites:

    (a) www.*linkexchange.com*

    (b) www.*coder.com*

    (c) www.*doubleclick.net/advertisers*

17. Investigate the high volume items that are being retailed on the Internet. Some examples are:

    Toys(www.e*Toys.com*)

      Software(www.*eggheads.com*)

    Movies(www.*real.com*)

Find more bestselling sites.

18. Study the site *traveljini.com* and analyses its marketing strategies. A brief history of *Traveljini* is given below:

    The tourism industry in India is fairly developed and there is scope for further development*. Traveljini.com* provides a unique business proposition for the tourism industry

by using e-commerce, so as to give tourism in India a greater visibility that is also cost-effective and reliable.

Traveljini.com Limited was established in June 2000 and is a portal dedicated to the exciting business of travel. It is one of India's premier travel portal backed by strong offline presence across the country.

*Traveljini.com o*ffers a complete solution relating to travel. Some of the services they provide include the best deals on flights, hotels, car rentals, cruises, and leisure holidays, and all these can be booked either online or offline. The site boasts of the most exhaustive travel-related information and has a slew of unique support services to ensure that a tourist's travel experience is unmatched. This guarantees that it is the one site that discerning travelers must check before setting out.

In over two years, Traveljini has established itself as the India's leading Internet travel company in terms of:

- brand recall
- depth of content
- transaction capability

Traveljini aims to set benchmarks in customer service, using the latest technologies in product development and delivery. They use fully-automated, customized software. A brick-and-mortar travel agency and an efficient customer service cell, which allows them to serve their clients to a hitherto unprecedented degree.

"To become the largest Travel Distribution Company in India by the simple expedient of putting the customer first."

TJ Travel Services Limited is another wholly-owned subsidiary of *Traveljini.com.* It is an IATA accredited travel agency, which provides back-end support for corporate business travel as well as handling flight ticketing in both the domestic and international sectors, for conferences, incentive travel and events.

Traveljini.com books domestic flights in India and international flights as well. They have an application called the *Smart Fare Finder* for special fares to various international destinations on the leading airlines of the world.

They also provide assistance in visa processing. They can also book hotel rooms in India and abroad. To make it easy for the customer, they offer easy access to their global hotel reservation system, so one can check real-time availability of rooms in 30,000 hotels

around the world. They have every kind of holiday that a traveller might want, from a cruise to a weekend to a romantic honeymoon.

If someone wants a holiday designed specially for him and his family, he can access Customjini. They allow buying of foreign exchange through their network and which is then delivered to the customer's doorstep. A service called Mapjini can be used to find ways in over 60 Indian cities if the need be. Business travelers can seek their services to organize a conference, a meeting, incentive travel or an exhibition. They also book cars in India for all kinds of travelers.

Exercise

Q.1 Explain traditional marketing and online marketing.

Q.2 what are key difference between traditional commerce and E-commerce?

Q.3 Explain terms like Internet marketing trend, target markets and marketing supports.

Q.4 Explain different marketing strategies.

Q.5 Write a short note on affiliate marketing.

Q.6 What is E-shopping? What are the advantages and disadvantages of e-shopping?

Q.7 Discuss the various available strategies of Internet advertisement

OR Explain various methods of internet advertising.

Q.8 Describe Internet advertisement. List out the advantages of Internet advertisement.

Q.9 What is e-retailing? Explain its advantages to consumer and business.

Q.10 Illustrate the process of online marketing with suitable example.

Q.11 What are the desirable characteristics of an Electronic Market Place.

Q.12 Discuss the different online marketing strategies in E-commerce.

Q.13 What types of Internet standards used in WWW?

Q.14 Explain the role of Software Agent in E-commerce.

Q.15 Differentiate between E-Marketing and traditional Marketing in details.

Q.16 write a note on: Target market.

Q.17 What are the advantages and disadvantages of online marketing?

Q.18 Write a short note on Browsing Behaviour Model.

Q.19 Define intelligent agent and how it can be used in E-marketing.

OR

Explain the tasks performed by intelligent agents in E-marketing.

Q.20 Write a short note on E-marketing value chain.

Q. 21 write a short note on: Achieving Web Presence Goals.

OR

How you can use web to increase customers.

Q.22 Explain Aggressive Matrices for E-business sites.

Q.23 Explain advantages of online marketing.

Q.24 Write a note on: Market Segmentation.

Q.25 Explain the use of One-to-One marketing in building customer relationship.

Q.26 Explain E- branding. Explain elements of branding.

Q.27 Explain spiral branding.

Q. 28 what is data mining? Explain how it can be used for market research.

Q.29 Explain different marketing strategies on the web.

Q.30 write a short note on: Internet marketing trends.

CHAPTER 3

E-security

Information System Security:-

Any business, whether it is a traditional brick-and-mortar business, a brick-and-click e-business, or a pure-play e-business, needs to be concerned about network security. The Internet is a public network consisting of thousands of private computer networks connected together. This means that a private computer network system is exposed to potential threats from anywhere on the public network. Protection against these threats requires businesses to have stringent security measures in place. In the physical world, crimes often leave evidence finger prints, footprints, witnesses, video on security cameras and so on. Online, a cyber-crime also leaves physical, electronic evidence, but unless good security measures are taken, it may be difficult to trace the source of a cyber-crime.

As seen in Figure 3.1 the goals of security are:
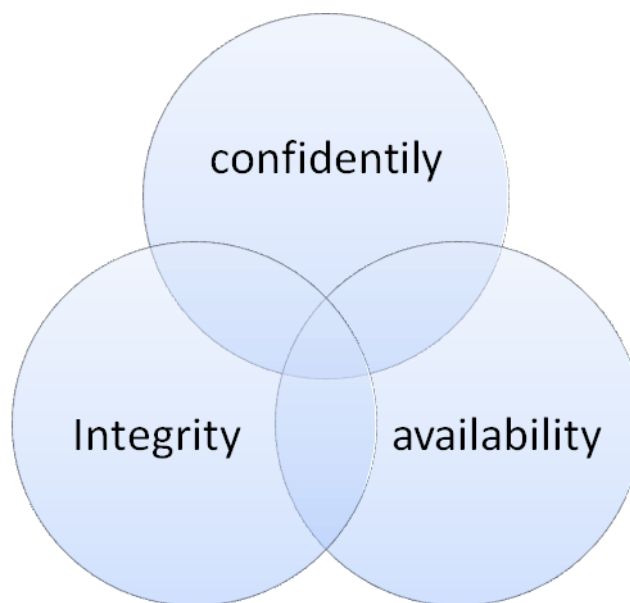
Fig. 3.1 Security goals.

1. Integrity of the data sent and received.
2. Confidentiality of the data so that it is not accessible to others.
3. The data ought to be available to the people for whom it is meant.

As shown in Figure 3.2, the data sent from the source ought to reach in destination without any tampering as shown in Figure 3.2(a). But the above criteria shown in Figure 3.2(a) may be violated by the following.

1. Interrupt the data and cut it off as shown in Figure 3.2(b).
2. Intercept the data with the intent of spying on it as shown in Figure 3.2(c).
3. Interrupt the data and modify it and send a different data to the receiver as shown in Figure 3.2(d).
4. Obstruct the data and fabricate new data and send it to the receiver as shown in Figure 3.2(e).

   - Encryption.
   - Software Controls (access limitations in a data base, in operating system protect each user from other users).
   - Hardware Controls (smartcard).
   - Policies (frequent changes of passwords)
   - Physical Controls

Additionally, e-businesses must protect against the unknown. New methods of attacking networks and websites and new network security holes are being discovered with disturbing
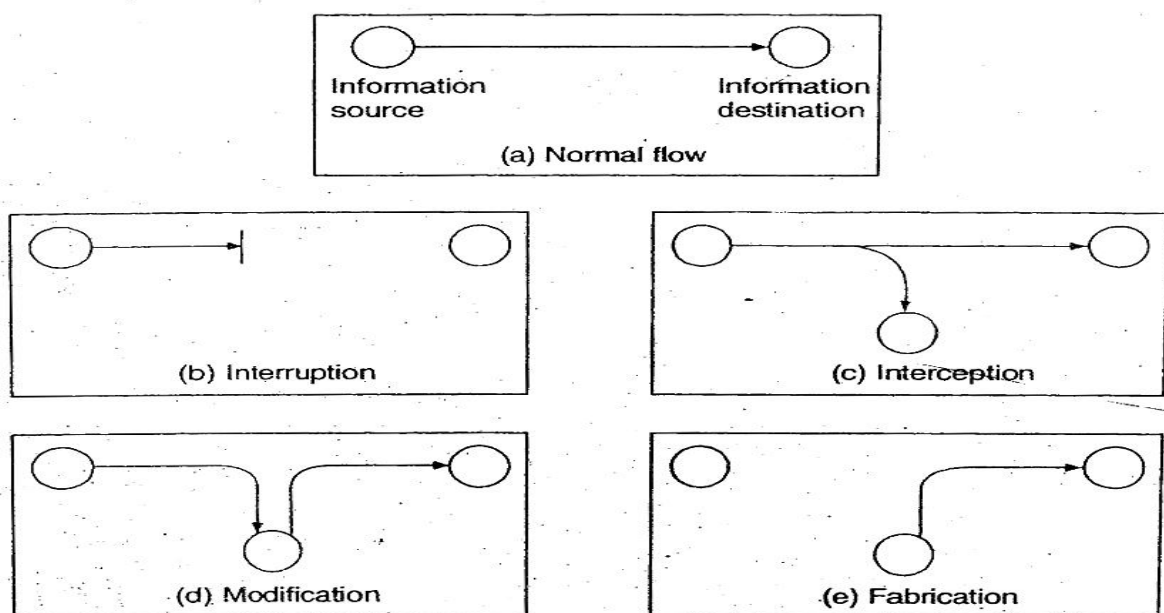
Fig. 3.2 Methods of defense.

Frequency. By carefully planning its network and website security system, an e-business can protect itself against many known and as yet unknown threats. An e-business must always he prepared for network and website attacks, or risk the loss of assets.

Another very important reason. To protect an e-business's network and website is to protect the e-business's relationships with its customers. Many Internet users perceive that there is a large risk to their privacy and security when they buy products and services or submit personal information online. Although the perception of risk may be greater than the actual risk, it is still a cause for concern. An e-business must address customers' perceived risks just as much as any actual risks.

An e-business cannot expect to achieve perfect security for its network and website. The important issue for an e-business is to have adequate security to protect its assets, revenue stream, customer privacy, and its own reputation.

Determining adequate security depends on an individual e-business's situation. For example, a website providing information on flavors of dog food may not require the same level of security as an online banking website. An e-business must determine its security needs according to the risk involved, the value of the assets at risk, and the cost of implementing a security system.

How does an e-business identify the security issues to be addressed? First, the e-business must thoroughly understand its business and how all its systems, not just its web servers, are used. Several aspects of e-business computer systems security need to be addressed.

Security has become one of the primary concerns when an organization connects its private network to the Internet. Regardless of the business, an increasing number of users on private networks are demanding access to Internet services such as the World Wide Web (WWW), Internet mail, Telnet, and File Transfer Protocol (FTP).

In addition, corporations want to offer web home pages and FTP servers for public access on the Internet.

Security on the Internet

Looking at Table 3.1, one can see the amount of money being spent on security of computer systems.

TABLE 3.1
GLOBAL SPENDING ON INTERNET SECURITY SOFTWARE 1998–20031

Year	*Revenues (in billion)*
1998	$3.2
1999	$4.4
2003	$8.3

Network administrators have increasing concerns about the security of their networks when they expose their organization's private data and networking infrastructure to Internet crackers. To provide the required level of protection, an organization needs a security to prevent unauthorized users from accessing resources on the private network and to protect against the unauthorized export of private information.

Even if an organization is not connected to the Internet, it may still want to establish an internal security policy to manage the user access to certain portions of the network and protect sensitive or secret information.

The fundamental problem may be that the Internet was not designed to be very secure i.e. open access for the purposes of research was the prime consideration at the time theInternet was implemented. However, the phenomenal success of the Internet, combined the introduction of different types of users, including unethical users, has made more seriousexisting security deficiencies to the extent that wide-open Internet sites risk inevitable break-ins and resultant damages. Other factors include the following:

1. *Vulnerable TCP/IP service***s.**A number of the TCP*A*P services are not secure an can be compromised by knowledgeable intruders; services used in the local area networking environment for improving network management are especially vulnerable

2. *Ease of spying and spoofing.*A majority of Internet traffic is unencrypted; e-mail passwords, and file transfers can be monitored and captured using readily available: software. Intruders can then reuse passwords to break into systems.

3. *Lack of polic***y.** Many sites are configured unintentionally for wide-open Internet access, without regard for the potential for abuse from the Internet; many sites permit more TCP⁄IP services than they require for their operations, and do attempt to limit access to information about their computers that could prove valuable to intruders.

4. ***Complexity of configuration.*** Host security access controls are often complexto configure and monitor; controls that are accidentally misconfigured often result unauthorized access.

Sites that ignore these problems face some significant risk that they will be attacked by intruders and that they may provide intruders with a staging ground for attacks on other networks. Even sites that do observe good security practices, face problems with new vulnerabilities in networking software and the persistence of some intruders.

Some of the problems with Internet security are the result of inherent vulnerabilities in the services (and the protocols that the services implement), while others are a result of host configuration and access controls that are poorly implemented or overly complex to administer. This is further aggravated by the tremendous growth of the Internet and the way it is used. Businesses and agencies now depend on the Internet for communications and research, and thus have much more to lose if their sites are attacked. The following sections describe the problems on the Internet and the factors that contribute to these problems.

1. ***How secure is the server software?*** Security, should be in place to prevent any unauthorized remote logon to the system. It should be extremely difficult to make changes to the server software. The servers themselves should be physically located in a secure environment.
2. ***How secure are communications?*** Customer credit card information, and other sensitive data that is being transmitted across the Internet must be protected.
3. ***How is the data protected once*** *it is delivered to the e-business?* Is it stored in unencrypted text files at the website? Is it moved to offlinestorag*e?*
4. ***How are credit card transactions authenticated and authorized?*** Credit card transactions must be authenticated and authorized, so as to make it more secure for the users.

Besides implementing secure technologies, an e-business should develop security policies and procedures. Everyone working in an e-business should understand his or her

responsibilities for keeping the business secure. Also, a plan of action should be ready to deal with any potential security problem.

The biggest potential security problem in an e-business is of human, rather than of electronic origin. The weakest link in any security system is the people using it. The employees of an e-business may not understand the security policy. Sometimes, the security policy is so burdensome that the employees are not able to follow.it, or refuse to follow it because it makes it difficult for them to get their work done. For example, employees may get annoyed at having to make frequent changes to logon passwords. At times, they may not understand the importance of security measures. Educating employees about the need for security and their role in the security processes is essential. Table 3.2 summarizes the general security issues that e-businesses must consider.

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TABLE 3.2
GENERAL SECURITY ISSUES

Issue	*Comment*
Connection to the Internet	Private computer networks are at risk from potential threatsTM from anywhere on the public Internet network.
Unknown risks.	New security holes and methods of attacking networks are being discovered with alarming frequency.
Customer privacy and security of customer information	Not only must steps be taken to protect the privacy of customer information, but also customers must be made aware of those steps and have confidence in them.
Security consciousness	Management and employees must understand the importance of security policies and procedures.

Security risks associated with a network and a website can be addressed in some ways as follow*s*:

Network and Website Security Risks:

As part of planning a startup e-business' security, management should become familiar with network and web server security risk terminology. Originally, hacker was a term used to describe gifted software programmers.

Today, hacker is a slang term used to refer to someone who deliberately gains unauthorized access to individual computers or computer networks. Ethical hackers use their skills to find weaknesses in computer systems and make them known, without regard for personal gain.

Malicious hackers, also called crackers, gain access to steal valuable information such as credit card numbers, attempt to disrupt service, or cause any other damage. Since there is a wide press coverage of computer system security breaches (i.e. breaks), the terms "hacker" and "cracker" are now generally used interchangeably for those involved in malicious, unauthorized computer system access.

An e-business must protect itself against unauthorized access to its computer network, denial-of-service traffic overloads, and the intrusion of destructive viruses.

Denial-of-Service Attacks:-

A Denial-of-Service or DoS attack is an attack on a network that is designed to disable the network by flooding it with useless traffic or activity. A distributed denial-of-service, or DoS, attack uses multiple computers to launch a DoS attack. While a DoS attack does not do any technical damage, it can do substantial financial damage to an e-business, because every second an e-business's network or a website is down, it may result in lost revenues.

The attacker first breaks into hundreds or thousands of random, insecure computers on the Internet and installs an attack program. Then he coordinates them all to attack the target simultaneously. Thereafter, the target is attacked from many places at once; the traditional defenses just do not work, and the system crashes.

These attacks are incredibly difficult, if not impossible, to defend against. In a traditional denial-of-service attack, the victim's computer might be able to figure out where the attack is coming from and shut down those connections. But in a distributed attack, there is no single source. The computer should shut down all connections except the ones it knows to be trustworthy, but that does not work for a public Internet site.

So far, these attacks are strictly denial-of-service. They do not affect the data on the - websites. These attacks cannot steal credit card numbers or proprietary information. They cannot transfer money out of your bank account to trade stocks in your name. Attackerscannot gain financially from these attacks. Still, they are very serious. For most big corporations, the biggest risk of a security breach is loss of income or loss of reputation, either of which is achieved by a conspicuous denial-of-service attack. The real problem is that there are hundreds of thousands, possibly millions, of innocent, naive computer users who are vulnerable to attack. They are using DSL or cable modems,

they're always on the Internet with static : IP addresses, and they can be taken over and used as launching pads for these attacks.

Viruses :-

Viruses are the most common security risk faced by e-businesses today. A virus is a small program that inserts itself into other program files that then become "infected", just as a virus in nature embeds itself in normal human cells.

The virus is spread when an infected program is executed, and this further infects other programs. Examples of virus effects include inability to boot, deletion of files or entire hard drives, inability to create or save files, and thousands of other possibilities.

A logic bomb is a virus whose attack is triggered by some event such as the date on a computer's system clock. A logic bomb may simply release a virus or it may be a virus itself. Viruses are generally introduced into a computer system via e-mail or by unauthorized network access. Virus examples include Stoned, Michelangelo, and AutoStart 9805.

Trojan horse. This takes its name from a story in Homer's Iliad, and is a special type of virus that emulates a benign application. It appears to do something useful or entertaining but actually does something else as well, such as destroying files or creating a "back door" entry point to give an intruder access to the system. A Trojan horse may be an e-mail in the form of attachment or a downloaded program. Trojan horse examples include BackOrifice, VBS/Freelink, and BackDoor-G.

Worm :-

This is a special type of virus that does not directly alter program files. Instead, a worm replaces a document or an application with its own code and then uses that code to position itself. Worms are often not noticed until their uncontrolled replication consumes system resources and slows down or stops the system. Worm examples include VBS/Loveletter, a VBS/Godzilla.worm, and Happy99.

A macro is a short program written in an application such as Microsoft Word or Excel to accomplish a series of keystrokes. A macro virus is a virus that infects Microsoft Word or Excel macros. Macro viruses can be introduced into a computer system as part of a Word or an Excel document received as an e-mail attachment, or as a file on disk. Opening the e-mail attachment or file triggers the macro virus.

Some viruses are, however, just hoaxes. Several antivirus software vendors maintain up-to-date information such as the Virus Information Library at McA*fee.com*, the Anti Viral Pro Virus Encyclopedia on viruses, worms, Trojan horses, and hoaxes. E-businesses also face other security issues related to doing business on the Web, such as website defacement,information theft, and data spills.

How Are Sites Hacked?

Distributed systems based on the client/server model have become common. In recent months, increase in the development and the use of distributed sniffers, scanners, and denial-of-service tools. Attacks using these tools can involve a large number of sites simultaneously and focus to attack one or more victim hosts or networks.

In a typical distributed attack system, the 'intruder' controls a small numb which in turn control a large number of daemons'. These daemons can be used to launch packet flooding or other attacks against the victims' targeted by the intruder.

In the incidents that have occurred so far, daemons were installed on several hundred sites, typically through the exploitation of well-known vulnerabilities that lead to root privileges on the compromised machines. Though some implementations of the daemon program do not require root privileges to launch attacks, in practice most of the daemons are concealed by the installation of 'root kits' designed to hide evidence of intrusion. There are indications that the processes for discovering vulnerable sites, compromising them, stalling daemons, and concealing the intrusion are largely automated, with each step being 'informed in 'batch' mode against many machines in one session. Daemons have been discovered on a variety of operating systems with varying levels of security and system management:

Once installed and operated, the daemon announces its presence to several (usually three or four) predefined masters and waits for further commands. The master program records that the daemon is ready to receive commands in an internal list, which can be retrieved by the intruder.

Masters can cause daemons in the list to launch attacks, shut down gracefully, or even announce themselves to a new master server. Intruders have used cryptographic techniques to conceal the information recorded by the master and daemons.

At the command from an intruder, the master can issue attack requests to the daemons in its list. These requests contain information about the requested attack such as

the address of the victim, the duration, and other parameters. The master programs frequently operate as ordinary user programs on compromised hosts, where their activity can easily be hidden.

Security Incidents on the Internet:-

As an evidence of the above, three problems have occurred within a short period of time. In the first, persistent vulnerabilities in the UNIX sendmail program were discovered. Sites which had not corrected their sendmail programs, were forced to scramble to correct the programs before their vulnerabilities were attacked.

However, due to the complexity of the sendmail program and networking software in general, three subsequent versions of sendmail were found to still contain significant vulnerabilities. The sendmail program is used widely.

And sites without firewalls to limit access to sendmail are forced to react quickly whenever problems are found and vulnerabilities revealed.

In the second, a version of a popular and a free FTP server was found to contain a Trojan horse that permitted privileged access to the server. Sites using this FTP server, but not necessarily, the contaminated version, were again forced to react very carefully and quickly to this situation.

Many sites rely on the wealth of free software available on the Internet, especially security-related software that adds capability for logging, access control, and integrity checking that vendors often do not provide as part of the operating system. While the software is often of high quality, sites may have little recourse other than to rely. On the authors of the software if it is found to have vulnerabilities and other problems.

The third problem has the strongest implications: intruders had broken into potentially thousands of systems throughout the Internet, including gateways between major networks, and installed sniffer programs to monitor network trafficfor usernames and static passwords typed in by users to connect to networked systems. The intruders had used various known techniques for breaking into systems, as well as using passwords that had been "sniffed".

One of the implications of this incident is that static or reusable passwords are obsolete for protecting access to user accounts. In fact, a user connecting to a remote system across the Internet may be unintentionally placing that system at the risk of attack by intruders who could be monitoring the network traffic to the remote system. :)

Weak Authentication:

Security handling teams estimate that many incidents stem from the use of weak, static passwords. Passwords on the Internet can be "cracked" in a number of different ways. However, the two most common methods are by cracking the encrypted form of the password and by monitoring communications channels for password packets.

The UNIX operating system usually stores an encrypted form of passwords in a file that can be read by normal users. The password file can be obtained by simply copying it. It can also be obtained by à number of other intruder methods.

Once the file is on hand, an intruder can run readily available password cracking programs against the passwords. If the passwords are weak, e.g. less than 8 characters, and so on, they could be cracked and used to gain access into the system.

Ease of Spying:-

It is important to note that when a user connects to her account on a remote host using Telnet or FTP, the user's password travels across the Internet unencrypted or in plain text. Thus, another method for breaking into systems is to monitor connections for P packets bearing a username and a password, and then using them on the system for normal login. If the captured password is to an administrator's account, then the job of obtaining privileged access is made much easier. As noted previously, hundreds and possibly thousands of systems across the Internet have been penetrated as a result of monitoring for usernames and passwords. E-mail, as well as the contents of Telnet and FTP sessions, can be monitored and used to learn information about a site and its business transactions. Most users do not encrypt e-mail. Since they assume that e-mail is secure and thus safe for transmitting sensitive information.

Ease of Spoofing:-

The IP address of a host is presumed to be valid and is therefore trusted by TCP and UDP services. A problem is that, using IP source routing, an attacker's host can masquerade as a trusted host or a client. Briefly, IP source routing is an option that can be used to specify a direct route to a destination and return path back to the origin.

The route can involve the use of other routers or hosts that normally would not be used to forward packets to the destination. An example of how this can be used such that

an attacker's system could masquerade as the trusted client of a particular server is as follows:

1. The attacker would change her host's IP address to match that of the trusted client.

2. The attacker would then construct a source route to the server that specifies the direct path the IP packets should take to the server and should take from the server back to the attacker's host, using the trusted client as the last hop in the route to the server.

3. The attacker sends a client request to the server using the source route.

4. The server accepts the client's request as if it came directly from the trusted client, and returns a reply to the trusted client.

5. The trusted client, using the source route, forwards the packet on to the attacker's host.

Many UNIX hosts accept source routed packets and will pass them on as the source route indicates. Many routers will accept source routed packets as well, whereas some routers can be configured to block source routed packets.

E-mail on the Internet is particularly easy to spoof and, without enhancements such as digital signatures, generally cannot be trusted. As a brief example, consider the exchange that takes place when Internet hosts exchange mail.

The exchange takes place using a simple protocol consisting of ASCII-character commands. An intruder could easily enter these commands on Telnet to connect directly to a system's Simple Mail Transfer Protocol (SMTP) port.

The receiving host trusts this sending host, and thus the origin of the mail is spoofed easily by entering a sender address that is different from the true address. As a result, any user, without privileges, can falsify or spoof e-mail.

Other services, such as Domain Name Service (DNS), can be spoofed, but with more difficulty than e-mail. These services still represent a threat that needs to be considered when using them.

How Vulnerable Are The Internet Sites?

The Internet, while being a useful and a vital network, is at the same time vulnerable to attacks. Sites that are connected to the Internet face significant risk in some form by intruders. The following factors would influence the level of risk:

- Number of systems connected to the site
- Services utilized by the site.

- Interconnectivity of the site to the Internet.
- Site's profile, or how well-known the site is.
- Site's readiness to handle computer security incidents.

The more the number of systems that are connected, obviously the harder it is to control their security. Equally, if a site is connected to the Internet at several points, it is likely to be more vulnerable to attacks than a site with a single gateway.

At the same time though, how well prepared a site is, and the degree to-which the site relies on the Internet, can increase or decrease the risk. A site's high profile could attract more potential intruders who wish to do some harm to the site's image: It should be mentioned though, that "quiet", less-frequently used sites are also attractive to intruders since they can more easily hide their activity:

Sites that use recommended procedures and controls for increasing computer security have significantly lower risks of attack. Firewalls, combined with one-time passwords that are immune from monitoring or guessing, can increase greatly a site's overall level of security and make using the Internet quite safe.

Website Defacement:-

Website vandalism or defacement can be the result of a hacker breaking into a network, accessing the website files, and modifying the HTML to physically change Web pages.

Not only do website defacements embarrass an e-business, but some website defacements can have serious financial repercussions. Aastrom Biosciences. Inc., a Michigan based medical products company, experienced a serious defacement created to manipulate its stock price. In February 2000, a bogus news release announcing a merger with a California biopharmaceutical company, Geron Corporation, was posted on Aastrom's website. Stock prices for both companies rose: Aastrom shares rose from $4 to $4.41 and Geron shares rose from $47.19 to $51.

After discovering the defacement, Aastrom notified Geron, and representatives of both companies advised officials with the NASDAQ index, where both stocks are traded, that there was no merger.

Electronic Industrial Espionage It is a major risk and a big dollar issue that most companies are reluctant to discuss openly electronic industrial espionage. Often, e-businesses that have been hacked and had business.

Secrets stolen are too embarrassed to admit the break-in. However, in late October 2009, one. very high-profile company, Microsoft, found itself scrambling to deal with first rumors and published reports of a serious hacking incident within industrial espionage overtones.

The apparent culprit was a Trojan horse virus named QAZ Trojan that was first identified in mid-July in China. The QAZ Trojan virus infects à computer system when a user opens an e-mail attachment containing the virus.

Then the virus replaces the system's Notepad text editor with its own code, searches for other shared hard drives to infect, and sends the IP addresses of infected computers to an outside e-mail address. This creates a "back door" a hacker can use to enter a system, search for passwords, and install software programs to allow remote control of the computer.

Although by August 2000, all major antivirus software makers had included the QAZTrojan information in their downloadable virus updates, somehow the QAZ Trojan virus was used to create a "back door" in Microsoft.

Credit Card Fraud and Theft of Customer Data:

Almost all B2C purchase transactions involve credit cards. An e-business that accepts credit cards in payment for goods and services, must secure the credit card information in transit to its website, and it must secure stored credit card information.

Also, systems must be in place for credit card transaction authentication (verifying that the person placing the order : really is the holder of the credit card used in the transaction), and credit card authorization .: (verifying that the charge can be made to the card number).

A hacker can break into a database server and steal thousands of credit card numbers and other information in a matter of moments, and an e-business might not even recognize that the hacker was there.

For example, one of the largest reported cases of stolen credit card information took place in January 1999 (but was not reported until much later) when information on 485,000 credit cards, including card numbers, expiration dates, names, and addresses, was

stolen from an e-business website and stored at a US government agency's website, where the agency's website administrator discovered the data. There was no reported evidence of fraudulent use, and some of the accounts were not active: But this event highlights the risk to a vulnerable e-business of the theft of sensitive information.

Security and E-mail :-

E-mail users who desire confidentiality and sender authentication use encryption. Encryption is simply intended to keep personal thoughts personal. There are two good programs to encrypt e-mails and they are: Pretty Good Privacy (PGP), and Privacy Enhanced Mail (PEM).

E-mail is typically encrypted for the reason that all network correspondence is open for eavesdropping. Internet e-mail is obviously far less secure than the postal system, where envelopes protect correspondence from casual snooping.

In contrast, the header area of any e-mail message will show that it has passed through a number of nodes on its way to you. Each of these nodes presents the opportunity for snooping.

Privacy Enhanced Mail Standard:-

PEM is the Internet Privacy Enhanced Mail standard, designed, proposed, but not yet officially adopted by the Internet Activities Board, to provide secure electronic mail over the Internet.

Designed to work with -current Internet e-mail formats, PEM includes encryption, authentication, and key management, and allows use of both public-key and secret-key crypto-systems. The system supports multiple cryptographic tools: for each mail message, the specific encryption algorithm, digital signature algorithm, hash function and so on, are specified in the header.

PEM explicitly supports only a few cryptographic algorithms; others may be added later. It uses the DES algorithm for encryption and the RSA algorithm for sender authentication and key management. PEM also provides support for non-repudiation, which allows the third-party recipient of a forwarded message to verify the identity of the message originator (not just the message forwarder) and to verify whether any of the original text has been altered.

Pretty Good Privacy (PGP) :-

Pretty Good Privacy (PGP) is the implementation of public-key cryptography based on RSA. It is a free software package developed by Phillip Zimmerman that encrypts e-mail. Since being published in US as freeware in June 1991, PGP has spread rapidly and has since become the de facto worldwide standard for encryption of e-mail.

It is freely available for DOS, Macintosh, UNIX, Amiga, VMS, Atari, and OS∕2 systems. PGP provides secure encryption of documents and data files that even advanced supercomputers are hard pressed - to "crack". The process is so simple that anyone with a PC can do it with almost no effort. : For authentication, PGP employs the RSA public-key encryption scheme and the MD5 (Message Digest version 5) developed by Rivets, a one-way hash function to form a digital signature that assures the receiver that an incoming message is authentic (that it comes from the alleged sender and that it has not been altered).

Network and Website. Security:-

The best way to recognize when a hacker is attempting unauthorized network access is to monitor network performance. Setting up, logging, and monitoring established network reference points, called benchmarks, can alert an e-business to security problems.

A skilled system administrator and other well-trained technicians, who use these benchmarks to monitor and manage the network and servers, are critical: Other tools such as passwords, firewalls, intrusion detection systems, and virus scanning software should be used to protect an e-business' network and website.

A password is a code, or more often a common word, used to gain access to a computer network. Passwords are only effective when used properly. Often a computer user chooses a bad password, such as a short, common word-a name, or birthdayso that the user can remember the password easily. One way hackers penetrate network security is by using software that "guesses" a password by trying millions of common words until one of the words that require a minimum length of six characters in a mix of letters and numbers increase the number of potential passwords into billions and make it more difficult for a hacker to guess them. A computer user should also change passwords regularity. If a user has access to multiple systems, it is a good idea to have different passwords on each system.

A firewall is a software or a hardware used to isolate and protect a private system or á network from the public network. A firewall provides an easy-to-manage entry point to multiple systems behind it.

Firewalls" can control the type of information that is allowed to pass from the public network to the private network, as well as what services inside the firewall are accessible from the outside. Firewalls can also log activity, to provide an audit trail in case the network is penetrated.

Intrusion detection is the ability to analyze real-time data to detect, log, and stop unauthorized network access as it happens. Businesses can install intrusion detection systems that monitor the network for real-time intrusions and respond to intrusions in a variety of user-detected ways.

An intrusion detection system can defend a website against DoS attacks by adding more servers to increase the traffic the website can handle, by using filters and routers to manage traffic, and by having a backup plan to reroute legitimate traffic during an attack.

Cisco's Secure Intrusion Detection System, and Network ICE'S ICEpacSecu Suite are two examples of intrusion detection systems. : Virus scanning software, including e-mail virus scanning, should be installed on all network computers. Antivirus software should be kept updated. Communication ports should be used to allow data to enter and exit the network.

The system administrator should close all unused communication ports. Up-to-date security patches for operating systems should be installed as soon as the patches are available, to prevent hackers from exploiting built-in system weaknesses.

Transaction Security and Data Protection Transaction security, especially for credit card transactions, and the protection of customer data are as important as website and network security. Tools to protect transaction data and customer data include:

- Using a predefined key to encrypt and decrypt the data during transmission.
- Using the Secure Sockets Layer (SSL) protocol to protect data transmitted over the Internet.

    SSL provides encryption of data between the browser on the customer's computer and the software on the Web server, allowing data such as credit card information to be transmitted securely.

SSL uses digital certificates so that a Web browser can authenticate the server it is connected to, making sure that credit card data is going to the appropriate server;

- Moving sensitive customer information such as credit card numbers offline, or encrypting the information if it is to be stored online;

- Removing all files and data from storage devices, including disk drives and tapes, before getting rid of the devices; and

- Shredding all hard-copy documents containing sensitive information before trashing them.

Of course, an e-business's security solutions are only as strong as its weakest link often its employees. An e-business must maintain a security-oriented culture, starting at the top, in order for employees to take security seriously. An e-business should also consider having its security systems tested or audited.

Security Audits and Penetration Testing:-

Security audits can provide an overall assessment of an e-business' systems and security issues by checking for vulnerabilities in those systems and providing recommendations for fixing those vulnerabilities. Security consultants such as DefendNet Solutions Inc., Internet Security Systems, and Pinkerton Systems Integration offer security auditing services.

Accounting firms, such as Ernest & Young, also offer security auditing services. Some of the Big Five international accounting firms use the American Institute of Certified Public Accountants (AICPA) Web Trust seal and audit criteria.

The WebTrust seal indicates to customers that the website is verified as being safe and secure by the AICP*A*. The AICP*Å* audit criteria cover best business practices, site security, and customer information privacy. Some accounting firms use their own audit seal instead of, or in addition to, the AICPA WebTrust seal.

When evaluating security consultants who will perform the penetration testing, there are several factors to consider. They can be listed as follows:

1. Get evidence that the security consultants have insurance to protect against accidental
2. System damage or down time.
3. Have everyone on the consultant's penetration team sign a non-disclosure agreement.

4. Consider requiring a third-party background check on each member of the consultant's penetration team.

5. Decide whether it makes sense to use a security consultant who employs former, hackers.

6. Determine if the consultant's team is going to use packaged security scanning software that could be employed by the in-house staff, or if they are using custom tools.

7. Develop a clear scope for the penetration test and a workable time frame.

8. Determine whether to have a DoS attack done, and if so, when to schedule it to least disrupt customer access.

9. Make sure the final report from the consultant includes an accounting of all attacks attempted and whether or not they were successful, a return of all the paper or electronic information gathered by the consultant, and recommendations on how to fix up any problems discovered during the tests.

Individual PC Security Risks:-

Often managers in an e-business use stand-alone personal computer during the startup phase, until funds are available to build and operate a network or until the e-business can outsource its IT operations. Additionally, some e-businesses offer their employees the opportunity to telecommute allowing an employee to use his or her home computer, or installing a business-owned personal computer in the employee's home.

Certainly, business employees often work on business files at home. Due to these factors, it is important for an e-business to understand that individual PCs are also at risk from hackers.

E-business Risk Management Issues:-

An e-business should manage its e-business risks as a business issue, not just as a technology issue. An e-business must consider the direct financial impact of immediate loss of revenue, compensatory payments, and future revenue loss from e-business risks such as:

1. Business interruptions caused by website defacement or denial-of-service attacks;

2. Litigation and settlement costs over employees' inappropriate use of e-mail and the Internet.

3. Product or service claims against items advertised and sold via a website.

4. Web-related copyright, trademark, and patent infringement lawsuits; and

5. Natural or weather-related disasters.

An e-business should put in place an effective risk management program that includes the following:

- Network and website security and intruder detection programs

- Antivirus protection

- Firewalls

- Sound security policies and procedures

- Employee education.

Another important component of a risk management program is the transfer of risk via insurance. Table 3.3 illustrates some of the different kinds of insurance coverage an e-business should consider when developing an effective risk management program. It is a good idea for an e-business's management to consult with a commercial insurance broker that offers e-risk management services, to help develop a risk management plan including insurance coverage. :

TABLE 3.3
E-RISK INSURANCE

E-risk insurance	*Coverage*
Computer Virus Transmission	Protects against losses that occur when employees open infected e-mail attachments or download virus-laden software.
Extortion and Reward	Responds to Internet extortion demands and/or pays *re*wards to help capture saboteurs.
Unauthorized Acces*s* Unauthorized Use	Covers failure to protect against third-party access to data and transactions.
Specialized Network Security	Responds to breach of network security and resulting losses.
Media Liability	Protects against intellectual property infringement losses.
Patent Infringement	Covers defensive and offensive costs when battling over patent infringement issues.

Computer Server and Services Errors & Omissions	Protects e-businesses against liability for errors and omissions when their professional advice causes a client's financial loss.

The Firewall Concept:-

An Internet firewall is a system or group of systems that enforces a security policy between an organization's network and the Internet. The firewall determines which inside services may be accessed from the outside, which outsiders are permitted access to the permitted inside services, and which outside services may be accessed by insiders.

For a firewall to be effective, all traffic to and from the Internet must pass through the firewall, where it can be inspected. The firewall must permit only authorized traffic to pass, and the firewall itself must be immune to penetration. Unfortunately, a firewall system cannot offer any protection once an attacker has got through or around the firewall.

It is important to note that an Internet firewall is not just a router, a bastion host, or a combination of devices that provides security for a network. The firewall is part of an overall security policy that creates a perimeter defence designed to protect the information resources of the organization. This security policy must include published security guidelines to inform users of their responsibilities; corporate policies defining network access, service access, local and remote user authentication, dial-in and dial-out, disk and data encryption, and virus protection measures and employee training.

All potential points of network attack must be protected with the same level of network security. Setting up an Internet firewall without a comprehensive security policy is like placing a steel door on a tent.

A firewall is an approach to security. It helps implement a larger security policy that defines the services and access to be permitted, and it is an implementation of that policy in terms of a network configuration, one or more host systems and routers, and other security measures such as advanced authentication in place of static passwords. The main purpose of a firewall system is to control access to or from a protected network, i.e. a site. It implements a network access policy by forcing connections to pass through the firewall, where they can be examined and evaluated. .

A firewall system can be a router, a personal computer, a host, or a collection of hosts, set up specifically to shield a site or a subnet from protocols and services that can be abused from hosts outside the subnet. A firewall system is usually located at a higher-

level gateway, such as a site's connection to the Internet. However, firewall systems can be located at lower level gateways to provide protection for some smaller collection of hosts or subnets.

Why Firewalls?

The general reasoning behind firewall usage is that without a firewall, a subnet's systems expose themselves to inherently insecure services, and to probes and attacks from hosts elsewhere on the network. In a firewall-less environment, network security relies totally on host security and all hosts must, in a sense, cooperate to achieve a uniformly higher level of security.

The larger the subnet, the less manageable it is to maintain all hosts at the same level of security. As mistakes and lapses in security become more common, break-ins occur not as the result of complex attacks, but because of simple errors in configuration and inadequate passwords.

A firewall approach provides numerous advantages to sites by helping to increase overall host security. The following sections summarize the primary benefits of using a firewall.

Protection of Vulnerable Services:-

A firewall can greatly improve network security and reduce risks to hosts on the subnet by filtering inherently insecure services. As a result, the subnet network environment is exposed to fewer risks, since only selected protocols will be able to pass through the firewall.

For example, a firewall could prohibit certain vulnerable services such as Network File System (NFS) from entering or leaving a protected subnet. This provides the benefit of preventing the services from being exploited by Outside attackers, but at the same time permits the use of these services with greatly reduced risk of exploitation.

Firewalls can also provide protection from routing-based attacks, such as source routing, and attempts to redirect routing paths to compromised sites via Internet Control Message Protocol or ICMP redirects. A firewall could reject all source-routed packets and ICMP redirects and then inform administrators of the incidents.

Controlled Access to Site Systems:-

A firewall also provides the ability to control access to site systems. For example, some hosts can be made reachable from outside networks, whereas others can be effectively sealed off from unwanted access. A site could prevent outside access to its hosts except for special cases such as mail servers or information servers.

This brings to the fore an access policy that firewalls are particularly adept at enforcing: do not provide access to hosts or services that do not require access. If, for example, a user requires little or no network access to her desktop workstation, then a firewall can enforce this policy.

Concentrated Security:-

A firewall can actually be less expensive for an organization in that all or most modified software and additional security software could be located on the firewall systems as opposed to being distributed on many hosts. In particular, one-time password systems and other add on authentication software could be located at the firewall as opposed to each system that needed to be accessed from the Internet.

Enhanced Privacy:

Privacy is of great concern to certain sites, since what would normally be considered innocuous information, might actually contain clues that would be useful to an attacker. Using a firewall, some sites wish to block services such as finger and Domain Name Service.

Finger displays information about users, such as their last login time, whether they have read mail, and other items. But, finger could leak information to attackers about how often a system is used, whether the system has active users connected, and whether the system could be attacked without drawing attention.

Firewalls can also be used to block DNS information about site systems; thus, the names and IP addresses of site systems would not be available to Internet hosts. Some sites feel that by blocking this information, they are hiding information that would otherwise be useful to attackers.

Need for Usage Statistics on Network:-

If all access to and from the Internet passes through a firewall, the firewall can log accesses and provide valuable statistics about network usage. A firewall, with appropriate alarms that sound when suspicious activity occurs, can also provide details on whether the firewall and network are being probed or attacked.

It is important to collect statistics about network usage and evidence of probing for a number of reasons. Of primary importance is, knowing whether the firewall is withstanding probes and attacks, and determining whether the controls on the firewall are adequate. Network usage statistics are also important as input into network requirements studies and risk analysis activities.

Policy Enforcement :-

Lastly, but perhaps most importantly, a firewall provides the means for implementing and enforcing a network access policy. In effect, a firewall provides access control to users and services.

Thus, a network access policy can be enforced by a firewall, whereas without a firewall, such a policy depends entirely on the cooperation of the users. A site may be able to depend on its own users for their cooperation. However, it cannot or it should not depend on the Internet users in general.

Firewall Components:-

The primary components (or aspects) of a firewall are:
1. Network policy.
2. Advanced authentication mechanisms
3. Packet filtering.
4. Application gateways.

The following sections describe each of these components in detail.

Network Policy:-

There are two levels of network policy that directly influence the design, installation and use of a firewall system. The higher-level policy is an issue-specific network access policy that defines those services which will be allowed or explicitly

denied from the restricted network, how these services will be used, and the conditions for exceptions to this policy.

The lower level policy describes how the firewall will actually go about restricting the access and filtering the services that were defined in the higher level policy. The following sections describe these policies in brief.

Service access policy :-

The service access policy should focus on Internet-specific use issues as defined above, and perhaps all outside network access (i.e., dial-in policy, and SLIP and PPP connections) as well. This policy should be an extension of an overall policy regarding the protection of information resources in the organization.

For a firewall to be successful, the service access policy must be realistic and sound, and should be drafted before implementing a firewall. A realistic policy is one that provides a balance between protecting the network from known risks, while still providing users access to network resources. If a firewall system denies or restricts services, it usually requires the strength of the service access policy to prevent the firewall's access controls from being modified on an ad hoc basis. Only a management-backed sound policy can provide this.

A firewall can implement a number of service access policies. However, a typical policy may be to allow no access to a site from the Internet, but allow access from the site to the Internet. Another typical policy would be to allow some access from the Internet, but perhaps only to selected systems such as information servers and e often implement service access policies that allow some user access from selected internal hosts, but this access would be granted only if necessary and only if it could be combined with advanced authentication.

Firewall design policy. The firewall design policy is specific to the firewall. It defines the rules used to implement the service access policy.

One cannot design this policy in a vacuum isolated from understanding issues such as firewall capabilities and limitations, and threats and vulnerabilities associated with TCP/IP. Firewalls generally implement one of the following two basic design policies.

- Permit any service unless it is expressly denied

- Deny, any service unless it is expressly permitted.

A firewall that implements the first policy allows all services to pass into the site default, with the exception of those services that the service access policy has identified disallowed. A firewall that implements the second policy denies, all services by default, passes those services that have been identifiedas allowed. This second policy follows classic access model used in all areas of information security.

The first policy is less desirable, since it offers more avenues for getting around firewall, i.e. users could access new services currently not denied by the policy (or even addressed by the policy) or run denied services at non-standard TC*P/*UDP ports that are not denied by the policy. Certain services such as X Windows, FTP, *A*rchie, and RPC can be filtered easily and are better accommodated by a firewall that implements the first policy. The second policy is stronger and safer, but is more difficult to implement and may imp. Users in that certain services such as those just mentioned may have to be blocked restricted.

The relationship between the high-level service access policy and its lower level counterpart is reflected in the discussion above. This relationship exists because the implementation the service access policy is heavily dependent upon the capabilities and limitations of t firewall system, as well as upon the inherent security problems associated with the want Internet services. For example, wanted services defined in the service access policy may ha to be denied if the inherent security problems in these services cannot be effectively control by the lower level policy and if the security of the network takes precedence over other factors. On the other hand, an organization that is heavily dependent on these services meet its mission may have to accept higher risk and allow access to these services. This relationship between the service access policy and its lower-level counterpart allows for an iterative process in defining both, thus producing the realistic and sound policy initial described.

The service access policy is the most significant component of the four described the other three components are used to implement and enforce the policy. (And as noted above, the service access policy should be a reflection of a strong overall organization security policy.) The effectiveness of the firewall system in protecting the network

depends on the type of firewall implementation used, the use of proper firewall procedures, and service access policy.

Advanced Authentication Security lapses on the identity of Internet users have occurred in part due to the weaknesses associated with traditional passwords. For years, users have been advised to choose password that would be difficult to guess, or not to reveal their passwords. However, even if user follow this advice and many do not), the fact that intruders can and do monitor the Interne for passwords that are transmitted in the clear has rendered traditional passwords obsolete

Advanced authentication measures such as smartcards, authentication tokens, biometrics and software-based mechanisms are designed to counter the weaknesses of traditional passwords while the authentication techniques vary, they are indeed similar in one aspect. The password Generated by advanced authentication devices cannot be reused by an attacker who has monitored a connection. Given the inherent problems with passwords on the Internet, an internet accessible firewall that does not use or does not contain the hooks to use advanced authentication makes little sense.

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Advanced Authentication:-

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Some of the more popular advanced authentication devices in use today are called one time password systems. A smartcard or authentication token, for example, generates a response that the host system can use in place of a traditional password.

The token or card works in conjunction with software or hardware on the host, and therefore, the generated response is unique for every login. The result is a one-time

password which, if monitored, cannot be reused by an intruder to gain access to an account.

Since firewalls can centralize and control site access, the firewall is the logical place for the advanced authentication software or hardware to be located. Although advanced authentication measures could be used at each host, it is more practical and manageable to centralize the measures at the firewall. Figure 3.3 illustrates that a site without a firewall using advanced authentication permits unauthenticated application traffic, such as Telnet or FTP, directly to site systems.

If the hosts do not use advanced authentication, then intruders could attempt to crack passwords or could monitor the network for login sessions that would include the passwords. The figure also shows a site with a firewall using advanced authentication, such that Telnet or FTP sessions originating from the Internet to site systems must pass the advanced authentication before being permitted to the site systems.

The site systems may still require static passwords before permitting access. However, these passwords would be protected against exploitation, even if the passwords are monitored, as long as the advanced authentication measures and other firewall components prevent intruders from penetrating or bypassing the firewall.
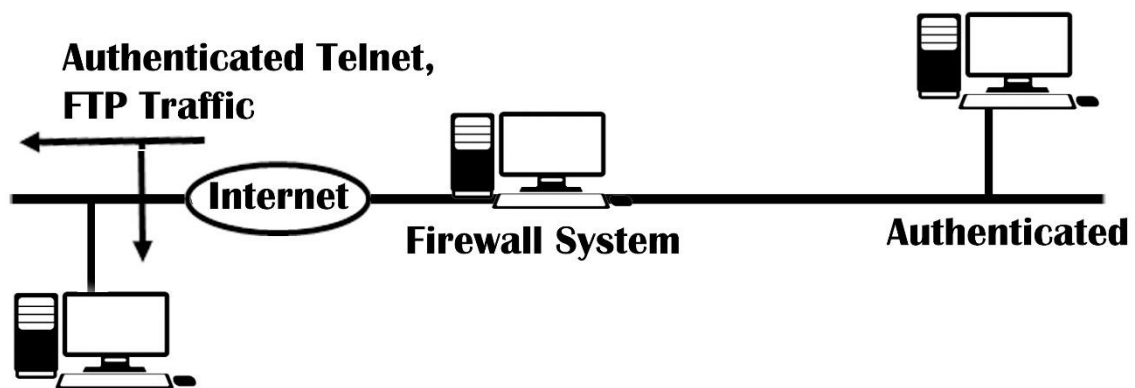
Fig. 3.3Advanced authentication on a firewall to pre-authenticate Telnet, FTP traffic.

Packet Filtering:-

IP packet filtering is done, usually, using a packet filtering router designed for filtering packets, as they pass between the router's interfaces. A packet filtering router usually can filter IP packets based on some or all of the following fields:

1. Source IP address
2. Destination IP address
3. TCP/UDP source port

4. TCP/UDP destination port.

Not all packet filtering routers currently filter the source TCP/UDP port, though vendors have now started incorporating this capability. Some routers examine the router's network interfaces in which a packet arrives, and then use this as an additional filtering criterion. Some UNIX hosts provide packet filtering capability, although most do not.

Filtering can be used in a variety of ways to block connections from or to specific hosts or networks, and to block connections to specific ports.

A site might wish to block connections from certain addresses, such as from hosts or sites that it considers to be hostile or untrustworthy. Alternatively, a site may wish to block connections from all addresses external to the site (with certain exceptions, such as SMTP for receiving e-mail) (see Figure 3.4).
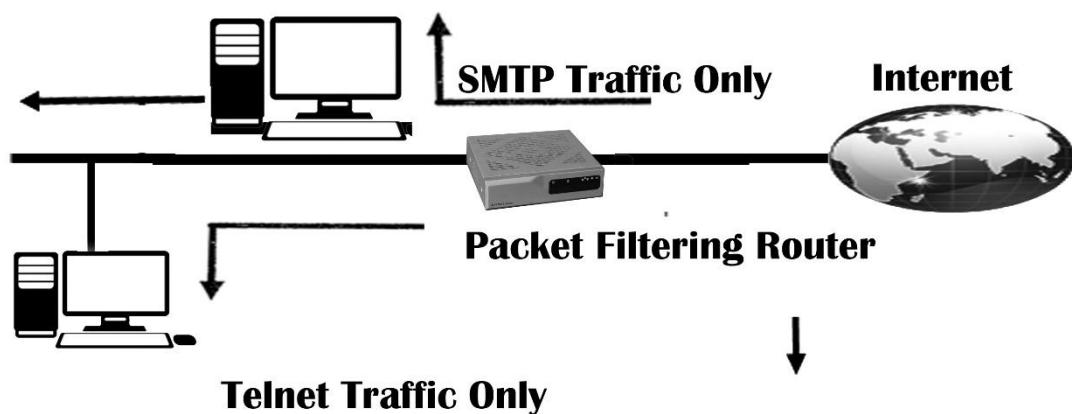
Fig. 3.4 Representation of packet filtering on Telnet and SMTP.

As an example of packet filtering, consider a policy to allow only certain connections to a network of address 123.4.**. Telnet connections will be allowed to only one host, 123.4.5.6, which may be the site's Telnet application gateway, and SMTP connections will be allowed to two hosts, 123.4.5.7 and 123.4.5.8, which may be the site's two electronic mail gateways. NNTP (Network News Transfer Protocol) is allowed only from the site's NNTP feed system, 129.6.48.254, and only to the site's NNTP server, 123.4.5.9, and NTP Network Time Protocol) is allowed to all hosts. All other services, and packets are to be blocked. An example of the rule-set is in Table 5.4.

<div align="center">

TABLE 3.4
PACKET FILTERING TABLE

</div>

Type	Source address	Destination Address	Source port	Destination port	Action
TCP	*	123.4.5.6	>1023	23	permit
TCP	*	123.4.5.6	>1023	25	permitpermitpermitpermit
TCP	*	123.4.5.6	>1023	2	*
TCP	129.6.58.254	123.4.5.6	>1023	119	
UDP	*	123.4.* *	>1023	123	
*	*	*	*	*	

The first rule allows TCP packets from any source address and port greater than 1023 on the Internet to the destination address of 123.4.5.6 and port of 23 at the site. Port 23 is the port associated with the Telnet server, and all Telnet clients should have unprivileged source ports of 1024 or higher. The second and third rules work in a similar fashion, except packets to destination addresses 123.4.5.1 and 123.4.5.8, and port 25 for SMTP, are permitted.

The fourth rule permits packets to the site's NNTP server, but only from source address 129.6.48.254 to destination address *1*23.4.5.9 and port 119 (1*29.6.48.254 is the only NNTP server that the site should receive news from, thus access to the site for NNTP is restricted to only that system). The fifth rule permits NTP traffic, which uses UDP as opposed to TCP, from any source to any destination address at the site. Finally, the sixth rule denies all other packets-if this rule is not present, the router may or may not deny all subsequent packets. This is a very basic .example of packet filtering. Actual rules permit more complex filtering and greater flexibility.

While some of these services such as Telnet or FTP are inherently risky, blocking access to these services completely may be too drastic a step for many sites. Not all systems · generally require access to all services. For example, restricting Telnet or FTP access from the Internet to only those systems that require the access can improve the security of users at no cost. Services such as NNTP may seem to pose little threat, but restricting these services to only those systems that need them helps to create a cleaner network environment and reduces the likelihood of exploitation from yet-to-be-discovered vulnerabilities and threats.

Application Gateways :-

To counter some of the weaknesses associated with packet filtering routers, firewalls need to use software applications to forward and filter connections for services

such as Telnet and FTP. Such an application is referred to as a proxy service, while the host running the proxy service is referred to as an application gateway. Application gateways and packet filtering routers can be combined to provide higher levels of security and flexibility than if either were used alone.

What Should a Firewall Contain?

Once the decision is made to use firewall technology to implement an organization's security -policy, the next step is to procure a firewall that provides the appropriate level of protection and is cost-effective. H*o*wev*e*r, what features should a firewall have, at a minimum, to provide effective protection? One cannot answer this question entirely with specifics, but it is possible to recommend that, in general, a firewall should have the following significant features or attributes.

1. Be able to support a "deny all services except those specifically permitted" design policy, even if that is not the policy used;
2. Support your security policy, not impose one;
3. Be flexible and able to accommodate new services and needs if the security policy of the organization changes;
4. Contain advanced authentication measures, or should contain the hooks for installing advanced authentication measures;
5. Employ filtering techniques to permit or deny services to specified host systems, as needed;
6. Use proxy services for services such as FTP and Telnet, so that advanced authentication measures can be employed and centralized at the firewall. If **se**rvices such as NNTP, http, or gopher are required, the firewall should contain the corresponding proxy services;
7. Contain the ability to centralize SMTP access, to reduce direct SMTP connections between site and remote systems. This results in centralized handling of site e-mail;
8. Accommodate public access to the site, such that public information servers can be protected by the firewall but can be segregated from site systems that do not require the public access;
9. Contain the ability to concentrate and filter dial-in access;

10. Contain mechanisms for logging traffic and suspicious activity, and also mechanisms for log reduction so that logs are readable and understandable;

11. Be developed in a manner that its strength and correctness is verifiable. It should be simple in design so that it can be understood and maintained;

12. Be updated with patches and other bug fixes, at regular time intervals.

If the firewall requires an operating system such as UNIX, a secured version of the operating system should be a part of the firewall, with other security tools as necessary to ensure firewall host integrity. The operating system should have all patches installed.

The IP filtering language should be flexible, user-friendly to program, and should filter on as many attributes as possible, including source and destination IP address, protocol type, source and destination TCP/UDP port, and inbound and outbound interface.

There are undoubtedly more issues and requirements, however many of them will be specific to each site's own needs. A thorough requirements definition and high-level risk assessment will identify most issues and requirements; however it should be emphasized that the Internet is a constantly changing network.

New vulnerabilities can arise, and new services and enhancements to other services may represent potential difficulties for any firewall installation. Therefore, flexibility to adapt to changing needs is an important consideration.

Benefits of an Internet Firewall:-

Internet firewalls manage access between the Internet and an organization's private network. Without a firewall, each host system on the private network is exposed to attacks from other hosts on the Internet. This means that the security of the private network would depend on the "hardness" of each host's security features and would be only as secure as the weakest system.

Internet firewalls allow the network administrator to define a centralized "choke point that keeps unauthorized users such as hackers, crackers, vandals, and spies, out of the protected network, prohibits potentially vulnerable services from entering or leaving the protected network, and provides protection from various types of routing attacks. An Internet firewall simplifies security management, since network security is consolidated

on the firewall systems rather than being distributed to every host in the entire private network.

Firewalls offer a convenient point where Internet security can be monitored and alarms generated. It should be noted that for organizations that have connections to the Internet, the question is not whether attacks will occur but, when do they occur? Network administrators must audit and log all significant traffic through the firewall.

If the network administrator does not take the time to respond to each alarm and examine logs on a regular basis, there is no need for the firewall, since thenetwork administrator will never know if the firewall has been successfully attacked! Few years, the Internet has been experiencing an address space crisis that has made registered IP addresses a scarce resource.

This means that organizations wanting to connect to the Internet may not be able to obtain enough registered IP addresses to meet the demands of their user population. An Internet firewall is a logical place to deploy a Network Address Translator (NAT) that can help alleviate the address space shortage and eliminate the need to renumber when an organization changes its ISPs.

An Internet firewall is the perfect point to audit or log Internet usage. This permits the network administrator to justify the expense of the Internet connection to management, pinpoint potential bandwidth bottlenecks, and provide a method for departmental charge backs if this fits the organization's financial model.

An Internet firewall can also offer a central point of contact for information delivery service to customers. The Internet firewall is the ideal location for deploying World Wide Web and FTP servers. The firewall can be configured to allow Internet access to these services, while prohibiting external access to other systems on the protected network.

Finally, some might argue that the deployment of an Internet firewall creates a single point of failure. It should be emphasized that if the connection to the Internet fails, the organization's private network will still continue to operate though the Internet access is lost. If there are multiple points of access, each one becomes a potential point of attack that the network administrator must firewall and monitor regularly.

By adequately securing little corners of cyberspace, you can instil and maintain the right levels of trustworthiness that your customers both demand and deserve. We have seen that e-security requires a holistic approach.

It is as much a set of behaviours as it is a bundle of software tools and network sniffers which, by themselves, might leave us with a false sense of security. Analogies abound in our everyday live*s*. We buy expensive alarm systems for our homes, move around elite communities, opt for a German Shepherd or a Doberman Pinscher, and yet we know that these are only partial solutions.

True security requires that you educate your staff, develop manageable security policies and procedures, and create a secure organization (whether it be one or many employees) that enforces those policies. It requires that you properly configure your network for your organization, without assuming that off-the-shelf configurations are right for you.

It also means investing in the tools and expertise that you deem necessary to evaluate and monitor your network in order to detect intrusions before they actually happen, as well as develop a clear strategy for dealing with an intrusion when it inevitably happens.

Finally, a secure network calls for constant vigilance. This means keeping up with the technological changes around you by reading trade journals and periodicals, joining user groups that discuss security issues and disseminate the latest security information, and attending conferences, seminars, and any relevant training that will keep you abreast of evolving security needs.

Defining an Enterprise-wide Security Framework:-

Traditionally, organizations have relied on policies to communicate high-level directives from the management. These documents, once issued, provide a top-down influence for everyone in the company-from business units to departments to individual employees. Furthermore, these policies typically were developed at one time in the organization's evolution to capture the current environment.

One of the major challenges for an organization in this area is the continued growth and adaptation of the policies to mirror the transformation within the organization. The fastest area of growth and change within an organization is Information Systems.

With the rapid development and push towards new technologies, organizations find themselves striving to maintain current technical environments with outdated

policies. Secondly, with the emergence of new technology strategies such as Intranets and Extranets, security and protection of informational assets has become paramount.

The first step is an enterprise-wide Information Systems security policy that is consistently enforced even as business needs change. Unfortunately, most companies have only bits and pieces of security scattered throughout the organization.

These may make some departments or individuals feel safe, but they do little to protect the enterprise as a whole. A security policy should include People, Policy, and Technology. The security process is a mixture of these three elements. Each element depends in some manner on the other elements. Also, issues receive greater coverage when the elements are combined. The controls environment is greatly enhanced when these three elements work in concert. A simple diagram will suffice to illustrate this (see Figure. 3.5). This diagram shows the basic elements and also the coverage areas.
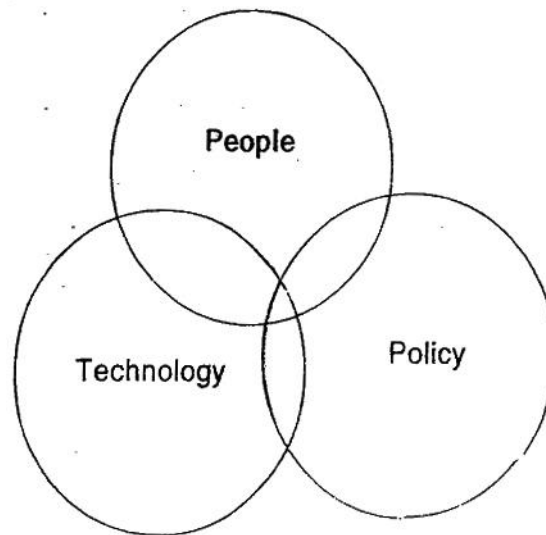
Fig. 3.5 People, policy and technology model.

As you move towards the union of these elements, the controls environment increases there is greater coverage. Let us understand these three elements individually.

People - This core clement is the most important. The people element comprises the people and various roles and responsibilities within the organization. These are the people that are put in place to execute and support the process. A few key roles include senior management, security administrators, system and IT administrators, end users, and auditors.

Policy - This element comprises the security vision statement, security policy and standards, and the control documentation. This is basically the written security environment—the bible that the security process will refer to for direction and guidance.

Technology - This element includes tools, methods, and mechanisms in place to support the process. These are core technologies--the operating systems, the databases, the applications, the security tools-embraced by the organization. The technology then is the enforcement, monitoring, and operational tools that will facilitate the process.

The concept is that each core element could be measured for effectiveness and coverage. Also, issues can be measured against the model to determine what controls coverage for that issue. The objective then is to move issues into the intersecting areas of the elements, with the final objective of moving the issue into the middle area of greatest coverage. As risk issues are identified, each step to manage the risk will fall into one of the core elements of people, policy, or technology.

If the issue is resolved with one of the elements, addressing one of the other elements can enhance this resolution. As the core elements are added to the controls environment and utilized in concert, the issue is then resolved on several fronts the controls coverage is greater.

The People, Policy, and Technology (PPT) Model:-

The PPT model can be illustrated with a few simple examples. Figure 3.6 shows the PPT model with regards to Internet usage and misuse. Users are educated on the proper usage of the Internet. The controls environment relies solely on the user. An Internet usage policy is written to document proper use of the Internet and the consequences of misuse. The controls environment now is supported by two of the three core elements.
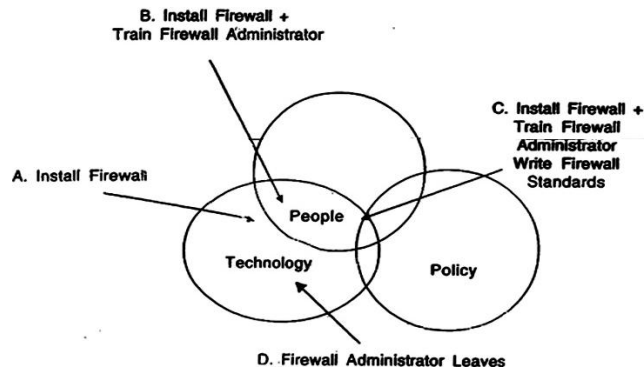
Fig. 3.6 Internet connection: coverage by three elements.

The PPT model is simply the analysis of a risk issue. If the issue is broken down into the three core elements, action items can be determined for each core element: In this manner, control coverage can be moved from one element to two, and ultimately to coverage by all of the elements.

Understanding the Security Framework

Key elements, also referred to as the "Four Pillars" to Information Security, include:

- Solid Senior Management Commitment.
- An overall Security Vision and Strategy.
- A comprehensive Training and Awareness Program.
- A solid Information Security Management Structure including key skill sets and documented responsibilities as depicted in Figure 3.7.

Within the four "pillars" of the program, several phases are included.

The first is the Decision Driver Phase, which contains factors determining the business drivers of security. These include Technology Strategy and Usage, Business Initiatives and Processes, and Threats, Vulnerabilities and Risk. All these combine to form a unique "Security Profile" of the organization. The "profile" needs to be reflected in the Security Policies and Technical Controls.

The next facet of the Information Security Framework includes the design of the security environment, also called the Design Phase. This is the stage where the

organization documents its security policy, the control environment and deals with controls on the technology level. A key element in this process is not only the clear definition of security policy and technical control information, but also the "Security Model" of the enterprise. Information Classifications and Risk Assessment methods fall under this component. These processes.

Decision Drivers			Business Initiatives & Processes	Threats	
		Technology Strategy & Usage		Vulnerability and Risk Assessment	
Design Phase			Policy		
			Security Model		
Implementation Phase		Security Architecture and Technical Standards			
		Administrative and End-user Guidelines and Procedures			
		Enforcement Processes	Monitoring Processes	Recovery Processes	

(Left vertical band: Senior Management Commitment. Right vertical band: Training and Awareness Program.)

Fig. 3.7 Information security management structure.

Allow the organization to manage risk appropriately and identify the risks and value of information assets.

The final facet of the Information Security Framework is the Implementation Phase. This begins by documenting the Administrative and End-User guidelines and procedures. These guidelines must be succinct and flexible for the changing environment.

Enforcement, Monitoring, and Recovery processes are then layered on for the operational support of the security program. These processes are "where the rubber hits the road". All the benefits of the Security Program design and documentation are diminished if it is not put into effect on an operational day-to-day basis.

Secure Physical Infrastructure:-

All of us are concerned about physical and environmental security. We may not always do a formal risk assessment exercise, but intuitively, we try to ensure that we are secure. BS 7799 is very explicit about the requirements of this domain, which is applicable to the business premises and business information processing facilities.

Design, implementation and monitoring of many controls for this domain will have to be jointly done with the physical security department.

Security can be best achieved by ensuring multiple layers of security and not depending on a single measure. This principle is very evident here. The controls for physical and environmental security are defined in three areas:

Security of the premises

Security of the equipment.

Secure behaviour

Security of the Premises:-

Physical security perimeter. We begin by defining the boundary of the premises and examining the security requirement, based on the risk assessment. The best way to do this will be to walk around the premises and 'case the joint.' Evaluate all the entry points through which an intruder could come in. Take help of a security agency to do this. Do not depend on your skills as an armchair detective. The classical approach to securing the premises is to create multiple barriers.

Start with the outermost perimeter. How much resistance this perimeter is expected to provide? Based on risk assessment, you need to decide all the physical specifications like height, width for the protective wall. Next, consider all the entry points.

Are the doors strong enough? Are the door frames strong enough? Are the windows, ventilators, air-conditioning firmly secured with grills? Do the physical barriers extend from real floor to real ceiling, or is there a gap between false ceiling and real ceiling through which somebody could crawl in? W*e* need to detect the weakest link while assessing the perimeter defense. How are the access points guarded? Are they controlled through card-controlled entry gates? Are watchmen, guards or receptionist monitoring the entry points?

Physical entry controls. Only the authorized persons should be allowed access to the secure areas. This objective could be achieved by having a clear access control policy defining the access rights. Based on this policy, appropriate measures should be in place.

These measures may take the form of access control devices like swipe card controlled doors, logging information about visitors and visible identification badges.

Securing offices, rooms and facilities. Location of the secure office within the physically secure perimeter should be chosen with care. All the risks pertaining to fire, flood, explosion, civil unrest and other forms of natural or man-made disaster should be considered.

There could also be threat from neighbouring premises, caused by leakage of water, spreading of fire, or storage of toxic/inflammable/explosive material. Even bulk supplies like stationery should not be stored within the secure premises.

The secure location should not be publicized in any manner. No display board, banners, signs to indicate the presence of any important information processing activity. Even the internal telephone directories should not be readily accessible to outsiders.

Support facilities like photocopier, fax machines, which are constantly accessed by everyone, should be located away from the secure area. Suitable intrusion detection systems like CCTV, motion sensors etc. should be installed and regularly tested.

Working in secure areas. Security equipment like CCTV and swipe-card controlled gates are of no use if the persons working in these locations are not trustworthy, or are incompetent, or simply lack awareness of their responsibility. They should be hand-picked and trained for these operations. They should not brag about their nature of work or location.

Also, information should be provided on need-to-know basis. Segregation of duties should be scrupulously followed with strict supervision. Third-party personnel

should be grante**d restricted access.** No photographic, video, audio or other recording equipment must be allowed inside the premises, unless **authorized.**

Isolated delivery and loading areas. We have taken care of every aspect of physical security in the above paragraphs, but do we know how canteen facilities get into secured premises? How the trash is taken out? How the courier delivers the parcels? In industrial premises, there could be constant movement of incoming and outgoing material. All this traffic needs to be isolated from the secure office area, so that it does not pose a threat.

Security of the Equipment:-

Equipment setting and protection. Our next concern is the appropriate security of the equipment. Information processing equipment needs to be handled carefully. The first level of equipment protection depends on physical location.

The location should minimize the need for unnecessary access, as well as prevent snooping. It should be such as to minimize the risk of theft as well as the risk from natural disasters like fire, flood, chemicals etc. Also, consider risks like electrical and electromagnetic interference, humidity etc.

Power supplies. Information processing will come to halt in the absence of a suitable power supply. This could be the worst type of a denial-of-service attack. A thorough business risks assessment is necessary to understand the impact on non-availability of power for certain durations. Based on the evaluation, appropriate measures need to be taken.

These could be:

1. Taking power from multiple feeds of electric supply.
2. In case all the electric supplies fail simultaneously, you need to have an uninterruptible power supply (UPS) with adequate battery capacity capable of sustaining the initial load.
3. The UPS could in-turn be supported by backup generator sets.
4. The backup generator would require adequate supply of fuel, which also needs to be stored with replenishment, assured by the suppliers.
5. Proper installation of emergency lights should also be planned; lightning protection should be provided to the power installation and the communication lines.

Cabling security. We really need to remember every detail, including the proverbial last nail. Do we know the physical layout of power cables and communication cables in our premises? The first step will be to obtain wiring diagrams and update them. Then, do a physical inspection and assess the protection needs against damage, interference or interception, establish the best practices for laying the network cables as well as power cables, and ensure that these are actually implemented. The next step is to decide on additional security protection required for the network.

This could be expensive for an old installation. Safety measures like use of armoured conduit cables, underground ducts, or fibre optic cabling will require huge investment and need to be justified based on risk assessment.

But simple measures like providing locks to the communication cable patch board, which are often over-looked, should be immediately implemented.

Equipment maintenance. It is normally expected that due care is taken for equipment maintenance, and proper records are maintained. From a security angle, two more measures are required. One is to maintain record of faults that were noticed, and the second step is to maintain records of all equipment sent off the premises for maintenance.

Security of equipment off premises. Shrinking size of computers and expanding wide area networks have made the computer equipment extremely mobile. Processing as well as storage capacity of mobile devices has been following Moore's law of doubling every 18 months.

Securing these devices is as important as securing the data centre. Various controls that should be considered are: administrative controls like permissions and corporate policy on use of mobile computers in places like airplanes, physical controls like securing the devices with security chains, alarms, and storing them at non-obvious places, using access control devices like USB tokens, and finally taking adequate insurance cover.

Secure disposal or reuse of equipment. Storage devices have long memory, unless specifically destroyed. Mere deletion is not enough. This becomes important when old computer equipment is disposed off or transferred to another location.

Equipment sent for repair is equally susceptible to reading of data from the 'deleted' storage devices. Every such device should be subjected to a thorough erasing and overwriting to destroy the data. Since some reports claim that the data could be recovered even after multiple overwriting and formatting, it may be desirable to physically destroy the media containing top secret information.

Secure Behaviour:-

Clear desk and clear screen policy. Our concern for information security should not stop at securing the premises and equipment. Sensitive information could be accessible in many forms, and it is necessary to identify and protect the information in all its incarnations.

Classification of information will help to identify the sensitivity, but having an organizational "clear desk and clear screen policy" could ensure actual protection. In brief, it means keep everything under lock and key and do not allow anybody to snoop. The following guidelines should be issued:

- Lock up all documents and media when not being used.
- Protect the computers and terminals through use of key locks, passwords, and screen
- Savers.
- Fax and telex machines used for confidential information should not be left unattended.
- Access to photocopiers and scanners is restricted after office hours.
- Printing of classified information should be supervised and all printouts must be removed immediately.

Removal of property. Any movement of equipment, information or software should be only with proper authorization. All these movements should be logged and records maintained for all outgoing and incoming items.

In these days of storage media capable of containing gigabytes of information, this procedure becomes very important. Employees should be made aware that spot checks would be carried out to ensure full compliance.

Security is being paranoid about threats. Physical security is very demonstrative about this paranoia. But, it also sets the tone about the organization's concern about information security.

Information Security Environment in India?

Most Indian companies that are aiming to go global will require certifying their ability to maintain proper security levels when scouting for international clients. Information security is no more a mere legal requirement but it is fast becoming a factor for companies to compete on and grow businesses. A "secure and reliable" environment-defined by strong copyright, IT and cyber laws-is an imperative for the growth and future success of the ITES--BPO industries.

NASSCOM has been proactive in pushing this cause and ensuring that the Indian Information Security environment benchmarks with the best across the globe. Indian ITES BPO companies today adhere to international best practices—they are regularly audited by independent certified auditors, comply with international standards at the highest levels, update procedures and practices regularly and meet, is not exceed the worldwide information security standards to ensure that data and personal information of international customers is adequately protected.

Security Environment in India:-

Indian companies are known for their quality deliverables. International certifications like ISO 9000 went a long way in establishing this reputation. Likewise following international standards in information security is also helping Indian companies build credibility among customers. While most Indian BPO firms are recognized for high quality processes and services, information security practices need to be constantly reviewed and updated according to the rapidly changing environment. Customer data demands special focus.

Indian companies have robust security practices comparable to those followed by western companies. Indian companies primarily comply with BS *7799*—a global standard that covers all domains of security.

Companies sign Service Level Agreements (SLA), which have very strict confidentiality and security clauses built into them at the network and data level. Such SLAs also cover all relevant laws that the companies want its offshore providers to comply with and actions that can be taken in case of breaches.

Laws such as the IT Act, 2000, Indian Copyright Act, Indian Penal Code Act and the Indian Contract Act, 1972 provide adequate safeguards to companies off shoring work

to US and UK. Most of the BPO companies providing services to UK clients ensure compliance with UK Data Protection Act, 1998 (DPA) through contractual agreements.

Companies dealing with US clients require compliance depending upon the industry served, e.g. Healthcare requires compliance with HIPAA, and financial services require compliance with GLBA.

To ensure compliance with such laws, Indian vendors follow security practices as specified by clients such as security awareness, protection of information, non-disclosure agreements, screening of employees, etc. Further, clients conduct periodic audits to ensure compliance. Many companies in India are undergoing/have undergone SAS-70 Audit. SAS-70 assignments helps service companies operating from India to implement and improve internal controls, ensure minimal disruptions to business from clients' auditors, and is potent marketing tool in the face of increasing competition.

NASSCOM's Security Initiatives:-

NASSCOM has taken a holistic view of Information Security through its 'Trusted Sourcing'3 Initiative to strengthen the regulatory framework and further improve India's attractiveness as an outsourcing destination.

This multi-pronged initiative is targeted at employees, organizations, enforcement agencies and policy amendment, through a '4E Framework' - Engagement, Education, Enactment and Enforcement.

NASSCOM has been working closely with the ITES-BPO industry in India, to create a, robust and secure Information Security culture, and in association with other stakeholders like the Indian Government on the issue of creating a relevant regulatory environment. All these initiatives aim to further strengthen information security environment, together with initiatives being rolled out by NASSCOM and the ITES-BPO industry.

NASSCOM, with the Indian government has also laid the foundation for the required legal framework through the proposed Amendments to the Indian IT Act of 2000 which includes laws and policies concerning data security and cybercrimes and the Indian Copyright Act of 1972 which deals with copyright issues in computer programs.

Trusted Sourcing Initiative:-

This initiative seeks to reinforce India as a secure and reliable technology partner. NASSCOM has also instituted the 4E framework to establish India as a trusted sourcing destination. This framework ensures highest standard of information security in the outsourcing industry in India.

As part of the trusted sourcing initiative, the following activities have been undertaken until now:

4Es	Activities planned	Status
Engage	Creation of Global and National Advisory Boardson Security Meet all stakeholders in India and key markets	National Advisory Board operational from December 2004 Engaged with the following stakeholders Department of Homeland Security Treasury--Infrastructure Compliance Federal Reserve Board --New York Industry bodies-- ITAA, FSTC, BITS Think tanks-Heritage, CSIS, IPI Academia-CMU
Educate	Reports to members on model contracts, SLAs, security practices and standards, industry legislation like HIPAAGLB, DPA Seminars to educate members, lawmakers and judiciary Create intellectual capital for members and other stakeholders	Focus on NASSCOM members-created awareness about secure sourcing Commissioned research reports on security Educated members on Model contracts, SLAs, best practices through reports and meetings Educational collateral for judiciary and police in India Set up training labs-currently 4 cyber labs operational Mumbai, Pune, Thane, Bangalore Imparts one-week training module to officers Organized awareness seminars for senior police leadership in Pune, Nasik, Jammu, Gandhinagar, Barrackpore, Aurangabad, Nagpur, Goa, Bhopal, Indore, Jaipur and Gujarat. Addressed workshops and seminars for trial judges Organized workshops for public prosecutors Cyber Safety Awareness Week being organized in Mumbai every year since 2003, also conducted in Hyderabad in July '66
Enact	Examine areas to strengthen legal framework in India Work with coalitions and regulators in key markets to identify relevant provisions	Working with Ministry of IT and Ministry of LawIT Act, 2000 being strengthened to bridge the gap US India Gap Analysis in place—areas ranging from hacking to credit card theft to health information to children's information. Consensus that IT Act, Contracts A Relief

		Act, Indian Penal Code, Consumer Protection Act, Arbitration & Conciliation Act, are largely sufficient to meet concerns The proposed Self-Regulatory Organization (SRO) for the industry is underway.
	Best security practices in member companies	Working with members to enact secure practices Physical security-access codes, security guards, fire suppression systems, etc. Network security-technological solutions like firewalls. Anti-virus at various levels, encryption methodologies, authentication and access controls, Intrusion Detection System, VPN etc. Information security - Employee background checks - No access to internet, cell phones, e-mail, instant messaging, not even paper and pens - Stringent customer audits to ensure compliance with GLBA, HIPAA, and other regulatory provisions Few cases of infringement-inter-agency co-operation between FBI and CBE-cases in court -Liaised with law enforcement to follow up cases involving data security to ensure adequate and prompt response.
Enforce	Established Cyber Labs in 4 cities—to be extended to other cities Security audit of members, security certification for employees Focus on personnel security	NASSCOM has formed an alliance with Business Software Alliance (BSA), and recently launched toll-free numbers to report software piracy Organized workshops for public prosecutors at Mumbai. Meetings with all India police officers to educate on cyber-security and how to recognize and prosecute cybercrime. NASSCOM launched the National Skills Registry of IT and BPO employees in January 2006.

NASSCOM'S Flagship Initiatives:-

Proposed Self-Regulatory Organization (SRO):-

The Self-Regulatory Organization has been conceptualized following an in-depth gap analysis of the Indian law and various international standards (like US and EU laws), identifying the loopholes and then attempting to amend the Indian law to make it equivalent to the global standards which exist. SRO is an independent, self-regulatory body that proposes a basic set of security and privacy standards, to which companies can

choose to adhere. This SRO would establish, monitor, and enforce privacy and data protection standards for India's ITES-BPO Industry.

National Skills Registry (NSR):-

NSR is a centralized database of all employees of the IT services and BPO companies in India. This database contains third party *ve*rified personal, qualification and career information of IT professionals.

The objective of NSR is to improve recruitment practices in IT and BPO industry, which will in turn help in maintaining India's global competitive advantage.

It is an employee-friendly measure to minimize any misuse of employee identity, where employers will be able to view the verified resume of the IT professional, if authorized by the professional.

Amendments to the Indian IT ACT :-

The Union Cabinet (on October 16, 2006) has approved the amendment to the IT Act, 2000. NASSCOM worked with the government to evolve recommendations for amendments to further strengthen the Indian IT Act, 2000. The recommendations are focused around protecting overseas customer data and tightening the punishment for defaulters. W*e* understand that these amendments have incorporated most of the recommendations, and are hopeful that this will lead to better handling of cybercrime by enforcement authorities. We expect this to be discussed in the winter session of the Parliament.

Additionally, most Indian IT and BPO companies conform to global standards such as BS 7799 and also specific standards depending on the country/sector they cater to. For example in the US, Healthcare requires compliance with HIPAA, Financial services require compliance with GLBA.

EXERCISES

Q.1 Explain security on the internet.
Q.2 How to provide security to email and website.
Q.3 How vulnerable is the internet sites?
Q.4 Explain firewall component and what should firewall contain.
Q.5 Give benefits of internet firewall.

Q.6 Discuss the security requirements of Internet and E-commerce applications and how these

    Requirements are fulfilled by various hardware and software systems.

Q.7 What are the security issues of E-commerce?

Q.8 Discuss password schemes and Biometric systems for implementing client server network

    Security.

Q.9 Discuss various threats posed by servers in a client server environment.

Q.10 Write short note on: (i) Biometric Systems. (iv) Digital Signatures.

Q.12 Discuss the various threats involved in client server communications and how are they

    Encountered in EC business.

Q.13 Explain how SSL(secure socket layer) helps an Ecommerce system to be secure.

Q.14 Explain intrusion mechanisms and intrusion detection techniques.

Q.15 What is the functionality of antivirus programs? How are viruses detected and fixed?

Q.16 Describe the Risk Management issues in E-Commerce.

Q.17 Explain about the E-Security

Q.18 Explain in brief E-security and E-payment.

Q.19 Explain how are websites hacked.

Q.20 Write a short note on: Network and Website Security risks.

Q.21 Write a short note on network security and its types.

    OR explain strategies or methods to provide network security.

Q.22 Explain few methods to provide security to email.

CHAPTER - 4

E-payment Systems

E-banking at ICICI Bank :-

The banking industry in India is facing unprecedented competition from non-traditional banking institutions, which now offer banking and financial services over the Internet. The deregulation of the banking industry coupled with the emergence of new technologies, are enabling new competitors to enter the financial services market quickly and efficiently.

Internet banking for E-banking) means any user with a personal computer and a browser can get connected to his bank-s website to perform any of the virtual banking functions. In internet banking system the bank has a centralized database that is web enabled.

All the services that the bank has permitted on the internet are displayed in menu. Any service can be selected and further interaction is dictated by the nature of service. The traditional branch model of bank is now giving place to an alternative delivery channels with ATM network.

Once the branch offices of bank are interconnected through terrestrial or satellite links, there would be no physical identity for any branch. It would a borderless entity permitting anytime, anywhere and anyhow banking.

The Internet banking is changing the banking industry and is having the major effects on banking relationships. Internet banking involves use of Internet for delivery of banking products & services.

It falls into four main categories, from Level 1 - minimum functionality sites that offer only access to deposit account data--to Level 4 sites--highly sophisticated offerings enabling integrated sales of additional products and access to other financial services such as investment and insurance. In other words a successful Internet banking solution offers

- Exceptional rates on Savings, CDs, and IRAs
- Checking with no monthly fee, free bill payment and relates on ATM surcharges
- Credit cards with low rates
- Easy online applications for all accounts, including personal loans and mortgages
- 24-hour account access

- Quality customer service with personal attention

ICICI Bank is India's second-largest bank with total assets of Rs 3,446.58 billion (US$ 79 billion) at March 31, 2007 and profit after tax of Rs 31.10 billion for fiscal 2007. The bank has a network of about 950 branches and 3,300 ATMs in India and presence in 17 countries.

ICICI Bank offers a wide range of banking products and financial services to corporate and retail customers through a variety of delivery channels and through its specialized subsidiaries and affiliates in the areas of investment banking, life and non-life insurance, venture capital and asset management. The bank currently has subsidiaries in several other countries.

ICICI Bank was originally promoted in 1994 by ICICI Limited, an Indian financial institution, and was its wholly-owned subsidiary. ICICI's shareholding in ICICI Bank was reduced to 46% through a public offering of shares in India in fiscal 1998, an equity offering in the form of ADRs listed on the NYSE in fiscal 2000, ICICI Bank's acquisition of Bank of Madura Limited in an all-stock amalgamation in fiscal 2001, and secondary market sales by ICICI to institutional investors in fiscal 2001 and fiscal 2002. ICICI was formed in 1955 at the initiative of the World Bank, the Government of India and representatives of Indian industry.

The principal objective was to create a development financial institution for providing medium-term and long-term project financing to Indian businesses. In the 1990s, ICICI transformed its business from a development financial institution offering only project finance to a diversified financial services group offering a wide variety of products and services, both directly and through a number of subsidiaries and affiliates like ICICI Bank. In 1999, ICICI become the first Indian company and the first bank or financial institution from non-Japan Asia to be listed on the NYSE.

Banking without borders has become an established concept as customers become increasingly sophisticated and international in their outlook. Banks across the globe have swiftly embraced this change by offering electronic banking across multiple channels. However, in this transition from branch banking to multi-channel banking, the key fact that has been overlooked is, customer convenience. As banks have adopted technology for electronic banking, the limitation of technology, to integrate with existing systems of the banks to provide a unified relationship view of the customers, has been a challenge.

Further, the lack of flexibility in systems built on obsolete technology has pushed banks to move with the times and offer *v*aried products to meet the changing needs of today's customers.

What banks need today is, a new generation electronic banking solution built on open architecture with robust security features that provides true relationship banking functionality.

The solution should not only meet today's business requirements but also be scalable and flexible enough to meet the changing demands of the retail customer.

Automated Teller Machine (ATM) :-

ATM is designed to perform the most important function of bank. It is operated by plastic card with its special features. The plastic card is replacing cheque, personal attendance of the customer, banking hour's restrictions and paper based verification. There are debit cards.

ATMs used as spring board for Electronic Fund Transfer. ATM itself can provide information about customers account and also receive instructions from customers-ATM cardholders.

An ATM is an Electronic Fund Transfer terminal capable of handling cash deposits, transfer between accounts, balance enquiries, cash withdrawals and pay bills. It may be on-line or off-line. The on-line *A*FM enables the customer to avail banking facilities from anywhere.

In off-line the Internet banking (or E-banking) means any user with a personal computer and a browser can get connected to his bank -s website to perform any of the virtual banking functions.

In internet banking system the bank has a centralized database that is web-enabled. All the services that the bank has permitted on the internet are displayed in menu.

Any service can be selected and further interaction is dictated by the nature of service. The traditional branch model of bank is now giving place to an alternative delivery channels with ATM network. Once the branch offices of bank ace interconnected through terrestrial or satellite links, there would be no physical identity for any branch. Any customer possessing ATM card issued by the Shared Payment Network System can go to any ATM linked to Shared Payment Networks and perform his transactions.

Credit Cards/Debit Cards :-

The Credit Card holder is empowered to spend wherever and whenever he wants with his Credit Card within the limits fixed by his bank. Credit Card is a post paid card. Debit Card, on the other hand, is a prepaid card with some stored value.

Every time a person uses this card, the Internet Banking house gets money transferred to its account from the bank of the buyer. The buyers account is debited with the exact amount of purchases.

An individual has to open an account with the issuing bank which gives debit card with a Personal Identification Number (PIN). When he makes a purchase, he enters his PIN on shops PIN pad.

When the card is slurped through the electronic terminal, it dials the acquiring bank system-either Master Card or VISA that validates the PIN and finds out from the issuing bank whether to accept or decline the transactions.

The customer can never overspend because the system rejects any: transaction which exceeds the balance in his account. The bank never faces a default because the amount spent is debited immediately from the customer's account:

ICICI Bank' Corporate Internet Banking (CIB) is a one stop shop for all your : online banking needs. It gives you the power to execute critical bank transactions instantly from your office locations with no time lags and hence is an indispensable tool in today's 24 x 7 high-speed business world.

With CIB, you can dramatically cut your paperwork and enjoy the triple benefits of 'efficiency, ease of use and economy'.

Non-Transaction Services

- Real Time Account Balance Information
- Download or Account Statements in six formals
- Subscription for Account Statements by E-mail
- Request for Cheque Book, Stop Payment and FD Opening
- Trade MIS to view all your trade-relater! Banking information.

Transaction Services

- Transfer funds within own ICICI account (Self account transfer)
- Transfer funds to channel partners ICICI account (Own to External transfer.)

- Transfer funds from channel partners ICICI account (External to Own)

- Transfer funds to non-ICICI Bank accounts using EFT/NEFT/RTGS.

- Utility Bill Payments to more than 85 billers across India

- Online Tax payment facility

- e-payment gateways.

Mobile Banking :-

In today's hectic corporate world, it may not be always easy to keep track of everything related to your finance and banking. Now with ICICI Bank's secured Mobile Banking Service, you can access your bank accounts and carry out transactions through your mobile.

Get alerts and reminders at the right moment and more. Our secured Mobile Banking Service answers your business needs, all through the push of a few buttons.

Push-based Alerts :-
- You will receive alerts for following transactions:
- Daily Closing Account balance
- Inward cheque returns above Rs 5000.00
- Outward cheque returns above Rs 5000.00
- Debit above Rs 5000.00
- Credit above Rs 5000.00

* Charges-as per schedule of charges.

Pull-based Alerts :-

You can register for Pull-based alerts only through Corporate Internet Banking (CIB).

The corporate users can avail the following banking services:

- Retrieve account balance.
- Retrieve last five transactions.
- Change SMS password.
- Unsubscribe from Mobile Banking.

- Status of issued cheque.

A powerful, scalable and flexible technology platform is essential for banks to manage growth and compete successfully. Finacle provides just the right platform to ICICI Bank, thereby fuelling its growth.

The bank has successfully leveraged the power of Finacle and has deployed the solution in the areas of core banking, consumer e-banking, corporate e-banking and CRM. With Finacle, ICICI Bank has also gained the flexibility to easily develop new products targeted at specific segments such as ICICI Bank Young Stars-a product targeting children, Women's Account addressing working women and Bank@campustargetting students.
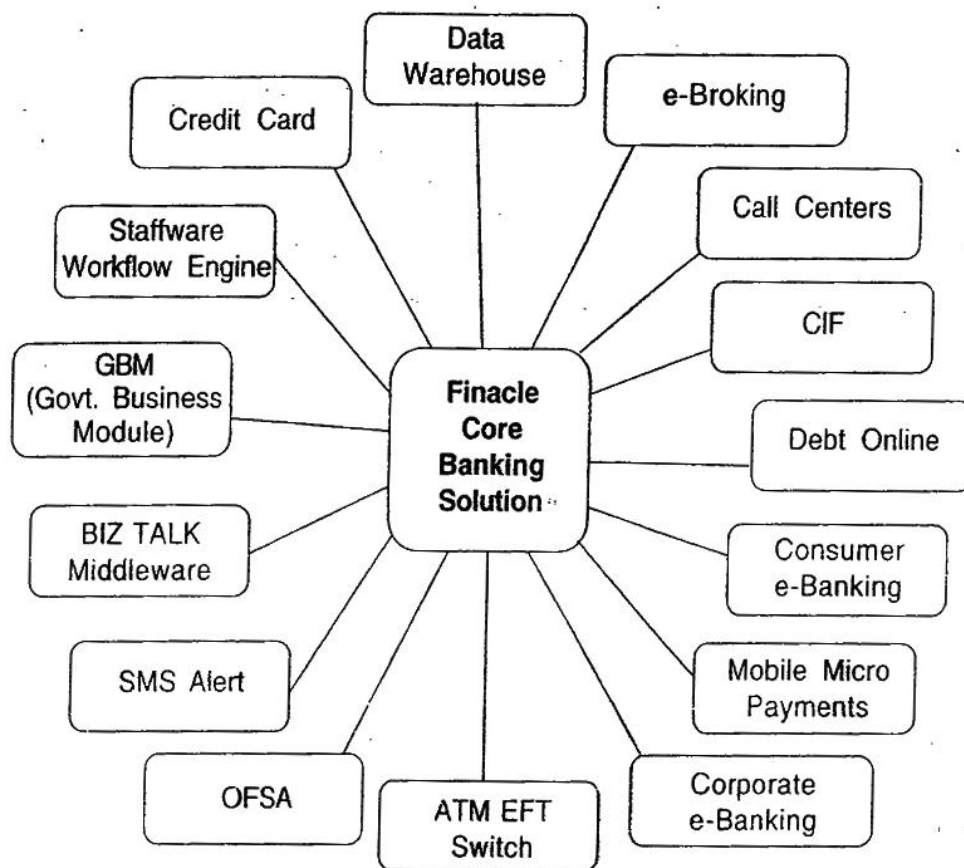
Main Concerns In Internet Banking :-

In a survey conducted by the Online Banking Association, member institutions rated security as the most important issue of online banking.

There is a dual requirement to protect customers' privacy and protect against fraud. Banking Securely: Online Banking via the World Wide Web provides an overview of Internet commerce and how one company handles secure banking for its financial institution clients and their customers.

Some basic information on the transmission of confidential data is presented in Security and Encryption on the Web. A multi-layered security architecture comprising firewalls, filtering routers, encryption and digital certification ensures that your account information is protected from unauthorized access:

- Firewalls and filtering routers ensure that only the legitimate Internet users are allowed to access the system.

- Encryption techniques used by the bank (including the sophisticated public key encryption) would ensure that privacy of data flowing between the browser and the Infinity system is protected.

- Digital certification procedures provide the assurance that the data you receive is from the Infinity system.

The growth of e-commerce is dependent, among other factors, on the existence of secure, user-friendly and cost-effective payment systems. Handling payments is a costly process that has been a central part of bank business for the past century.

However, it is now being transformed by technological developments, and in particular, the Internet. The importance of the payment function lies in the fact that it could encourage convergence between sectors with disparate objectives, since payment systems are the common denominator of all e-commerce transactions.

Conceptually, the alternative means of payment available for e-commerce may be classified as either electronic money *(*e-money), or electronic access products. The difference between them is that whereas electronic access products basically provide Internet access to traditional products (credit card payments, bank transfers, and the like), e-money is a new concept, and in particular is considered to be "private money not depending on central bank reserves."

Table 4.1 shows the payment systems in the US and Table 4.2 depicts the comfort levels of consumers with regard to various payment methods.

TABLE 4.1
PAYMENT SYSTEMS IN THE US, 1999–2010[2]

Volume ($ trillion)	1999	2005	2010
Paper	$3.3 (69%)	$3.4 (50%)	$3.6 (36%)
Cards	$1.4 (28%)	$2.7 (39%)	$4.3 (49%)
Electronic	$0.2 (3%)	$0.7 (11%)	$1.3 (15%)
Total	$4.9 (100%)	$6.8 (100%)	$8.7 (100%)

TABLE 4.2
CONSUMER COMFORT LEVELS OF USING VARIOUS PAYMENT METHODS[3]

Method	Comfortable	Uncomfortable
Billed later	68%	18%
Credit card	55%	27%
Debit card	32%	49%
Checking account	25%	57%
Debit card with PIN	20%	66%

Consolidated methods of payment used for distance selling mostly at national level, such as cheque, cash-on-delivery and credit-transfer mechanisms, have proven easy to adapt to electronic transactions.

The credit card system has to date been the usual payments instrument for goods ordered over the Internet. This is despite security concerns and relatively higher transaction cost.

Nevertheless, the lack of a widely accepted e-payment system is not considered to be a major barrier for the gearing up of e-commerce. The most important factors are undoubtedly user trust and user confidence.

E-payment systems are becoming central to e-commerce 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.

The current state of online electronic payments is in many ways reminiscent of the medieval ages. The merchants of Asia and Europe faced a similar problem while trying to unlock the commercial potential of the expanding marketplace. Those ancient traders faced a number of obstacles, such as conflicting local laws and customs regarding commercial practices, and incompatible and nonconvertible currencies that restricted trade.

To circumvent some of these problems, traders invented various forms of payment instruments, such as promissory notes, bills of exchange, gold coins, and barter. The merchants also developed commercial law surrounding the use of these instruments, that proved to be one of the turning points in the history of trade and commerce. We are on the verge of a similar sort of development today with regard to e-payment systems.

Table 4.3 shows trends in online payments.

TABLE 4.3
ONLINE BANKING HOUSEHOLDS AND THOSE THAT PAY ONLINE[4]

Year	Banking online (million)	Paying online
2003	29.6	50%
2004	35.3	57%
2005	40.9	64%
2006	46.2	71%
2007	51.3	78%
2008	56.0	85%

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, cheques, 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) for bits and pieces of information must be accepted by vendors in real time. Conventional instruments are too slow for micropayments, 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 new payment instruments must be secure, have a low processing cost, and be accepted widely as global currency tender. -

History's Lesson About Payments: People Drive Change :-

The development of money is not dependent solely on objective characteristics. Subjective valuations play a critical role. Ultimately consumers determine what form of money is most desirable people simply substitute cheaper and more convenient forms of money for expensive and inconvenient forms. It is ultimately through this substitution in use that new money forms embed themselves in the marketplace.

Up until that time, it was assumed that money and payment systems had been invented and imposed by the state.

Money is a social phenomenon, with its roots in the barter economy; payment systems evolved out of the barter economy—and empowered buyers and sellers—with the development of money as a medium of exchange. Buyers and sellers recognized that doing business became much more efficient if everyone used a commonly accepted form of payment.

The notion of money continues to evolve, driven by overwhelming marketplace preference for increased convenience and efficiency, and decreasing risk and costs.

The modem payment card system is an excellent example of this organic, socially-driven growth-the creation of new forms of exchange that continue to make life easier and more efficient.

So long as the human condition continues to change, payment systems will continue to evolve, driven by those powerful market forces.

Digital Payment Requirements:-

For any digital payment system to succeed, the criteria given in Table 6.4 ought to be satisfied.

TABLE 4.4
DIGITAL PAYMENT REQUIREMENTS

Criteria	*Need for the criteria*
Acceptability	Payment infrastructure needs to be widely accepted.
Anonymity	Identity of the customers should be protected
Convertibility	Digital money should be convertible to any type of fund.
Efficiency	Cost per transaction should be near zero.
Integration	Interfaces should be created to support the existing system.
Scalability	Infrastructure should not breakdown if new customers and merchants join.
Security	Should allow financial transactions over open networks.
Reliability	Should avoid single points of failure.
Usability	Payment should he as easy as in the real world,

Online Payment Categories

Online payments can be broadly divided into three categories as shown in Table 6.5.

TABLE 4.5 ONLINE PAYMENT CATEGORIES

Category	*Description*
Micropayment	Transaction value less than 5 euros or dollars. Transaction costs are nearly zero.
Consumer payments	Transaction value between 5 and 500 euros or dollars.
Business payments	Payments are executed by credit card transactions. Transaction value more than 500 euros or dollars. Debit cards or invoices are appropriate solutions in this system.

E-payment systems are proliferating in banking, retail, healthcare, online markets, and even in government–in fact, anywhere money needs to change hands. Organizations are motivated by the need to deliver products and services more cost-effectively and to provide a higher quality of service to customers. Research into e-payment systems for consumers can be traced back to the 1940s, and the first applications, the credit cards, appeared soon after. In the early 1970s, the emerging electronic payment technology was labelled electronic funds transfer (EFT). 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 fine new institution 10 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 cheques (or other paper orders to pay) by truck, train, or airplane.

Since 1947. significant changes have taken place in funds transfer. You can find them listed here, in Table 6.6.

TABLE 4.6
SIGNIFICANT INNOVATIONS IN MODERN PAYMENT SYSTEMS

Year	Innovations
1947	Flatbush National Bank issues first general-purpose credit card, for use in select New York shops.
1950	Diners Club Charge Card introduced.
mid-1950s	The development of magnetic ink character recognition (MICR) facilitated timelier processing of cheques, sealed the cheque's standing as the preferred non-cash payment option.
1958	BankAmerica, in Fresno, California, executes the first mass mailing of credit cards.
1967	Westminster Bank installs the first automated teller machine at Victoria, London branch.
1970	The New York Clearing House launches CHIPS--the Clearing House Interbank Payments System which provides US dollar funds transfer and transaction settlements online and in real time.
late 1970s	Chemical Bank launches its Pronto system providing 3000 computer terminals to customers' homes linked to its central computers by telephone. It offers a range of facilities: balance inquiries, money transfers between Chemical Bank accounts, and bill payments to selected local stores. The stumbling block for first-generation home-banking systems in general was who is to pay for the terminals at home*?*
1985	Electronic Data Interchange (EDI) extensively used in bank-to-bank payment systems.
1994	Digital cash trials by DigiCash of Holland conducted online.
1995	Mondex electronic currency trials begin in Sweden, England.

Digital Token-based E-payment Systems :-

The introduction of charge cards in the early 1900s, beginning with western union in 1914, represented a breakthrough in payments. But while these cards enhanced customer loyalty and stimulated repeat behaviour, they were generally limited to the local market, or in store use.

In 1958, Bank of America took a major step forward, introducing what eventually became the modern credit card. Based on extensive test marketing in Fresno, California, it became clear there was a large market for a general purpose bank card featuring a revolving credit facility and wide acceptance.

With the launch of Bank of America's card, the consumer was not tied to one merchant or product, but was now free to make credit purchases at a wide range of outlets. *A*s the adoption of the bank card grew, the potential size of the market for transactions expanded geometrically. It was a profound turning point in the history of money.

The development of the modern electronic payment network took an important step forward in the mid-1970s, with the creation of a global joint venture that would eventually be known as visa.

Through shared investments, the visa association created a global system to authorize transactions, clear and settle electronic payments, codify operating regulations to protect consumers and merchants alike, and set interoperability standards to ensure that, unlike cash and cheques, a visa card could be used anywhere in the world.

Two developments in the 1990s further broadened the utility of electronic payments.

Debit cards, a popular "pay non product, allowed consumers to access funds in a demand deposit account to conduct transaction at the point of sale; and e-commerce emerged as mainstream business channel, both relying on and stimulating electronic payments.

The rapid adoption of these relatively recent developments demonstrates the speed at which the payments landscape is changing. Looking forward, there is broad experimentation in ways to migrate electronic payment functions into consumer devices such as mobile phones, PDAs, and other popular electronic products.

This process is well underway in some European and Asian markets where mobile phones are nearly as ubiquitous as payment cards. Visa describes this new range of payment choices as "u-commerce," or universal commerce the ability to conduct commerce anywhere, anytime, or any way.

This shift in consumer preference is driving major changes in personal consumer expenditures (PCE). The growth in card usage as a share of PCE continues to expand relative to cash and cheques.

Also, in most markets around the world, the use of cash and cheques is declining-a trend that is likely to continue. The trend away from cash and cheques is driven by well established benefits of electronic payments to all parties.

Benefits to Buyers :-

- Convenience of global acceptance, a wide range of payment options, and enhanced financial management tools.
- Enhanced security and reduced liability for stolen or misused cards.
- Consumer protection through an established system of dispute resolution.
- Convenient and immediate access to funds on deposit via debit cards.
- Accessibility to immediate credit. Intuitively, the comparative cost of arranging for a consumer loan relative to the ability to obtain credit at the point of sale is substantial in considering both the direct processing costs as well as the implicit opportunity costs to borrower and lender.

Benefits to Sellers:-

- Speed and security of the transaction processing chain from verification and authorization to clearing and settlement.
- Freedom from more costly labor, materials and accounting services that are required in paper-based processing.
- Better management of cash flow, inventory and financial planning due to swift bank payment.
- Incremental purchasing power on the part of the consumer.
- Cost and risk savings by eliminating the need to run an in-house credit facility.

A dramatic example of the efficiencies created by electronic payments can be seen in the public sector, where governments have used innovations such as purchasing card to reduce paperwork, enhance financial controls, and create more robust accounting and financial data.

Convenience:-

Anyone who has searched through pockets for exact change for parking, fumbled with foreign currency, paid exorbitant foreign exchange commissions, tried to cash a cheque in another country or been concerned about carrying a large roll of banknotes can appreciate the convenience of payment cards.

Fundamental to this convenience is the virtually ubiquitous acceptance and utility, whether it is an apparel store in Paris or a crafts shop in Nepal. Payment cards work in brick and mortar environments, over the phone, on the Internet, and through the post.

Applications are underway that support new uses such as recurring payments, insurance and payroll disbursements, rent and utility bills, and small ticket transactions such as vending machines and car parks.

Consumers place an enormous value on convenience, although this paper has not attempted to measure it. The sheer convenience of being able to access cash at an ATM or conduct a transaction directly at the point of sale with a credit or debit card clearly has had an impact on economic growth.

None of the banking or retailing payment methods in their present form are completely adequate for the consumer-oriented e-commerce environment. Their deficiency is their assumption that the parties will, at some time or other, be in each other's physical presence or that there will be a sufficient delay in the payment process for frauds, overdrafts, and other undesirables to be identified and corrected.

These assumptions may not hold good for e-commerce and so, many of these payment mechanisms are being modified and adapted for the conduct of business over networks.

Entirely new forms of financial instruments are also being developed. One such new financial instrument is *electronic tokens,* which are available in the form of electronic cash/ money or cheques. Electronic tokens are designed as electronic analogues of various forms of payment backed by a bank or a financial institution. Simply stated, electronic tokens are equivalent to cash that is backed by a bank.

Credit Cards as E-payment Systems:-

Without doubt, the basic means of payment used and initiated via the Internet for consumer transactions till date is the credit card. Credit cards have proved popular for a number of reasons as the following:

1. The system is familiar to users and was widely used before the advent of e-commerce, thus bolstering the users' confidence.

2. Transaction costs are hidden from users (i.e. basically met by sellers, and passed on to all customers, not just credit card users).

3. Payment is simple anywhere and in any currency, thus matching the global reach of the Internet.

4. The credit-issuing company shares the transaction risk; helping overcome consumers' fear and reluctance to buy goods they have not actually seen, from sellers they do not know (in the physical world this function was important because it enabled sellers to take payment from buyers they do not know; online this trust relationship is needed in both directions).

The disadvantages of credit cards for e-commerce include the fact that they cannot be used directly for small value payments or peer-to-peer transactions.

Disadvantages of Credit Cards:-

Credit cards have their own disadvantages. First, the relatively high transaction cost makes them impractical for small-value payments. Second, they cannot be used directly by individuals to make payments to other individuals (peer-to-peer transactions).

Third, protecting the security of transactions is vital, especially in the virtual world where there is no payment guarantee to the merchant by a bank. Users' fears about security issues seem to be a consequence of the newness and relative unfamiliarity of the medium, rather than the real risks involved in the system.

E-payments in India:-

India's payment system is evolving to support e-payments in tandem with paper-based payments after the Reserve Bank of India started promoting automation in the banking industry in the 1990s.

The RBI initially set up an electronic clearing service (ECS) to clear low-value, large-volume payments such as direct credits and debits within four days, and this drive succeeded despite the varying automation levels of India's banks.

Just recently, the RBI also built out the national EFT system for a special EFT (SEFT) system to act as a key component of India's e-payment system and to resolve last-mile connectivity issues between entities, according to FinanceAsia.com.

Payment systems such as ECS and SEFT will in turn promote credit and debit card use in India, while the issuance of chip-based payment cards is expected to take off quickly.

Once the RBI rolls out its real-time gross settlement system (RTGS), India's banks and businesses will be better able to use the Internet to realize the value of e-payments to their operations.

For greater automation in India's payment system, the RBI has also linked clearing houses via Infinite (Indian Financial Network, a telecom network), set up a centralized funds management system (CFMS), and centralized the payments and settlement systems.

While India is unlikely to achieve a national e-payment infrastructure in the immediate future, "banks that do not invest or are unable to upgrade their technology will be at a significant disadvantage", according to FinanceAsia.com.

New e-payment systems will enable banks to offer their clients value-added services and support the propagation of e-payments to their suppliers.

Banks doing so optimize the management of their funds and boost their productivity, while enterprises improve their receivables management for greater payments efficiency, reduced operating costs and better risk management.

Credit card issuers have solid opportunities in the Indian market, with projections for 2005 ranging from 10 million to 14 million cards, up from about 6 million in early 2003, according to Electronic Payments International. Merrill Lynch also reports that card transaction volumes have risen 41 per cent in 2003 over 2002, to $2.2 billion, with a total of $5.3 billion likely by 2005.

In terms of card numbers, annual growth of 20 per cent to 25 per cent is expected through 2005, when some analysts expect 14 million to 15 million credit cards to be in issue, even though debit cards are overtaking credit cards in popularity.

India's payments market is still dominated by cash and cheques, but almost every bank issues credit cards, with MasterCard being the acknowledged leader in terms of market penetration, at 4.21 million, or 84 per cent of cards.

Visa leads in terms of card usage, and in 2002 had 64 per cent of transaction volume, EPI reports, with a similar ratio in the debit card market, in which MasterCard has 57 per cent of cards issued, but only a 29 per cent share of transaction volume. Debit cards are fuelling India's cards market, given its credit averse consumers, and the country was Visa's fastest-growing market for card issuance in 2003.

Merchant and consumer use of credit cards in India has been restricted both by government laws requiring credit cardholders to lodge a tax return, and by the anonymity of cash, which does not leave audit trails.

Most merchants are small, family-run businesses, and do not see credit card acceptance as beneficial, while cardholders must pay a 5 per cent tax on all transactions made. Credit card issuers are however on standby to tap an expanded market for credit cards that is expected to result from strong growth in India's economy, which is in turn boosting average household incomes and demand for credit cards.

Security Issue and Encryption:-

What has proven to be a problem from the security point of view is not interception, but authentication. Some of the most serious cases of online fraud seem to be involved with the use of details of cards used in traditional ways (e.g. payments slips collected from among paper wastes).

Having collected the card numbers, by some means, fraudsters exploit the anonymity of the Internet to use the details and make untraceable purchases (when making cross-border purchases, they may be further aided by the fact that the address-verification system used by merchants to compare billing and delivery information in the US is useless overseas).

In response to this threat, credit-issuing companies are planning to implement measures such as the use of smart cards to improve authentication. Also in the US, Visa and MasterCard and others have joined forces to develop the Secure Electronic Transactions *(*SET) standard for online payments; a single technical specification for safeguarding payment card purchases made over open networks. It includes digital signatures and digital certificates for all parties involved: customers, merchants, and financial institutions.

SET combines a range of cryptographic means, using algorithms based on DES (Data Encryption Standard) and RSA (the encryption algorithm invented by Rivest, Shamir and Adlem: n in 1976).

US Credit Card Fraud Statistics, 2000-2007

Year	Total fraud (USD mn)	Online fraud rates	Amount of online fraud (USD mn)
2000	1,663.7	3.0%	823.65
2001	1,750.5	2.5%	852.63
2002	1.823.7	2.1%	857.85
2003	2.373.2	2.5%	1,227.88
2004	2.664.9	2.4%	1,456.92
2005	2.745.4	2.2%	1,611.39
2006	3.028.8	2.0%	1,729.00
2007	3.212.7	2.0%	1,988.35

Source: Celent Communications, via. Lafferty Publications.

How Online Fraud is Committed in the US.

Method	Percentage
Lost or stolen card	48%
Identity theft	15%
Skimming (or cloning)	14%
Counterfeit card	12%
Mail intercept fraud	6%
Other	5%

Source: Celent Communications, January 2003.

E-payment Security in Indian Banks :-

Five banks in India-ICICI Bank, State Bank of India, Bank of Baroda, IndusInd Bank and Citibank (India) have started a pilot EMV program in partnership with Indian tech consortium, Zero-Mass, and Bell ID.

The State Bank of India is to provide clearing and settlement for the pilot, which will use Bell ID's ANDIS4EMV solution to manage the lifecycle of the chip-based credit and debit cards. Even after the cards are issued. issuers can use the card management software to add, modify and delete applications, while managing data preparation, risk parameter management, and key processing.

Separately, MasterCard, POS terminal provider. Dione, and ATM supplier, NCR, are to equip the Indian market for debit cards which local banks are starting to issue to their savings and current accountholders.

Dione and NCR will offer their turnkey solution to banks and third-party processors, while MasterCard members in India are expected to issue over 5 million debit cards by the end of 2003.

The Dione POS terminal to be used in this partnership is a compact countertop EMV level 1 and 2 model, which enables either the cardholder cr the cashier to enter the card, and accepts both mag-stripe and PIN-secured chip cards

India's KarurVysya Bank has meanwhile launched Smart Cash, a global debit card that is powered by the Visa Electron platform, to enable its ATM customers to use their cards as debit cards.

Since Visa South Asia has 10 million debit card members in India, and over 70,000 affiliated merchants, Visa is keen to extend its Electron debit operations to rural and semi-rural locations in India.

United Bank of India (UBI) is also to offer a debit card to all its savings account holders from January 2004, to help customers better manage their finances and reduce the use of paper cash or cheques.

Encryption and Credit Cards :-

Encryption is instantiated when credit card information is entered into a browser or other e-commerce device and sent securely over the network from a buyer to a seller as an encrypted message.

This practice however, does not meet the important requirements of an adequate financial system, such as non-refutability, speed, safety, privacy, and security. To make a credit card transaction truly secure and non-refutable, the following sequence of steps must occur before actual goods, services, or funds flow:

1. A customer presents his or her credit card information (along with an authenticity signature, or other information such as mother's maiden name) securely to the merchant.
2. The merchant validates the customer's identity as the owner of the card account.
3. The merchant relays the credit card charge information and signature to its bank or online credit card processors.

4. The bank or processing party relays the information to the customer's bank for authorization approval.
5. The customer's bank returns the credit card data, charge authentication, and authorization to the merchant.

In this scheme, each consumer and each vendor generates a public key and a secret key. The public key is sent to the credit card company and put on its public key server. The secret key is re-encrypted with a password, and the unencrypted version is erased.

To steal a credit card number, a thief would have to get access to both a consumer's encrypted secret key and password. The credit card company sends the consumer a credit card number and a credit limit.

To buy something from vendor X, the consumer sends vendor X the message, "It is now time T. I am paying Y dollars to X for item Z." Then the consumer uses his or her password to sign the message with the public key.

The vendor will then sign the message with its own secret key and send it to the credit card company, which will bill the consumer for Y dollars and give the same amount (less the fee) to X.

Nobody can cheat in this system. The consumer cannot claim that he did not agree to the transaction, because he has signed on it (as in everyday life). The vendor cannot levy fake charges, because he does not have access to the consumer's key.

He cannot impose the same charge twice, because the consumer has included the precise time in the message. To become more useful, credit card systems will have to develop distributed key servers and card checkers. Otherwise, a concentrated attack on these sites could bring the system to a halt.

Support for Privacy Enhanced Mail (PEM) and Pretty Good Privacy (PGP) encryption 'has been built into several browsers. Both of these schemes can be substantially bolstered with the addition of encryption to defeat snooping attacks.

Unfortunately, whether existing credit card companies will accept digital signatures as real signature is not clear. And so, vendors will have a difficult time when customers dispute the charges made using encrypted credit card numbers over the Internet.

When credit card companies do decide to accept digital signatures, they also need to maintain a public server with all the public keys. This method assumes that the credit card company will keep the vendor honest, as is the case with traditional credit card transactions. E-payment processing is not an inexpensive proposition, however. But neither is it fraudulent.

If e-commerce takes off and small transactions increase without a fully encrypted system in place, fraud will become expensive all the more.

Providing credit card processing service for numerous half-dollar and one-dollar transactions may not be financially attractive, compared to the average credit card transaction of about $60.

If this process is extended to all of the micropayment services that are ultimately available over the Internet (e.g. 20-cent file transfers and $1 video game rentals), the overall processing load on key system components are likely to become unmanageable or commercially non-viable unless a significant amount of automation takes place. To solve this problem, third-party payment processors can be undertaken.

Business Pros and Cons of Credit Card-based Payment :-

Third-party processing for credit cards entails a number of pros and cons. These companies are chartered to give credit accounts 10 individuals and act as bill collecting agencies for businesses. Consumers use credit by presenting them for payment and then paying an aggregate bill every month. Consumers pay either by flat fee or individual transaction charge service.

Merchants get paid for the credit card drafts that they submit to the credit card company. Businesses get charged a transaction charge ranging between 1 per cent to 3 per cent for each draft submitted.

Credit cards have advantages over cheques in that, the credit card company assumes a larger share of financial risk on both the buyer and the seller in a transaction. Buyers can sometimes dispute a charge retroactively and have the credit card company act on their behalf.

Sellers are ensured that they will be paid for all their sales and they need not worry about the fraud. This becomes a convenience for the buyer in that, the credit card transactions are usually quicker and easier than cheque (and sometimes even cash) transactions. One disadvantage to credit cards is that their transactions are not

anonymous, and credit card companies do in fact compile valuable data about spending habits.

Record keeping with credit cards is one of the features consumers value most, because of disputes and mistakes in billing. Disputes may arise because different services may have different policies.

For example, an information provider might charge for partial delivery of a file (the user may have abandoned the session after reading a part of the file), and a movie distributor might charge depending on how much of the video had been downloaded.

The cause of interrupted delivery needs to be considered while resolving disputes. In general, implementing payment policies will be simpler when payment is made by credit card rather than by cash.

The complexity of credit card processing takes place in the verification phase, a potential bottleneck. If there is a lapse in time. Between the charging and the delivery of goods or services (for example, when an airline ticket is purchased well in advance of the date of travel), the customer verification process is simple because it does not have to be done in real time.

In fact, all the relaying and authorizations occur after the customer merchant transaction is completed, unless the authorization request-is-denied. However, if the customer wants a report (or even a digital airline ticket) to be downloaded into a PC or other information appliance immediately at the time of purchase, many message relays and authorizations take place in real time, while the customer waits.

Such exchanges may require many sequence-specific operations, such as staged encryption and decryption and exchanges of cryptographic keys.

Encryption and transaction speed must be balanced however; as research has shown that online users get impatient and typically wait for 20 seconds before pursuing other actions. Hence, online credit card users must find the process to be accessible, simple, and fast.

Speed will have design and cost implications, as it is a function of network capabilities, computing power available at every server, and the specific form of the transaction. The infrastructure supporting the exchange must be reliable.

The user must feel confident that the supporting payment infrastructure will be available on demand and that the system will operate reasonably well, regardless of component failures or system load conditions. The builders and providers of this

infrastructure are aware of customer requirements and are in fierce competition to fill those needs.

The Mobile Payments :-

The biggest wildcard in the e-commerce and e-payment field at the moment is the way mobile Internet access develops.

Already schemes such as Internet access via SMS (short message service), and pre-paid re-loadable cards are in place, allowing payment to be made via a mobile phone. The use of the SIM card in the user's mobile phone as part of a payment system implies a shift in the roles of both banks and telephone operators.

Classification of New Payment Systems:-

For the time being, the New Payment Systems can be roughly divided into 2 groups: one, using smart cards, and the other using the Internet. Traditional payment instruments such as cash, cheques, credit cards, EF*T/*POS, and account transfer have strong points convenience and ease of circulation—but they are weak due to their high handling costs.

The New Payment Systems are an experiment to augment payment instruments with the use of networks and electronics, while maintaining the strength of the older systems. The methods to be used by the New Payment Systems as in Table 6.7 can be classified in the following manner:

1. Cash substitution
2. Cheque substitution
3. Credit card substitution
4. Account transfer substitution systems.

TABLE 4.7
GROUPS AND EXAMPLES OF THE NEW PAYMENT SYSTEMS

Technology	*Substitution*	*Circulation within the banking system*	*Circulation outside the banking system*
Smart Card	Cash	Visa International: Visa Cash Electronic Payment Services: SmartCash	Mondex International: Mondex
	Cash Cheque	CyberCash: CyberCoin Checkfree: Check:Free Payment Services FSTC: Electronic Check	Digicash: e-cash
Internet	Credit Card	CyberCash: Credit Card Service	

	EFT	First Virtual Holdings: Internet Payment System Intuit: Quicken Microsoft: Money Meca Software: Managing Your Money Cardinal Bancshares; Security First Network Bank	

Smart Card Cash Payment System :-

We will first look at the smart card-based cash payment system. In the early 1990s, a payment system for low value amounts using smart cards was first introduced in Europe.

Most of these methods are known a*s stored value card*s or *electronic purse system.* Units of prepayment or currency value are electronically stored on an IC chip imbedded in these cards. When purchases are made, the payment is effected through these units of electronic value.

Smart cards are credit au debit cards and other card products enhanced with microprocessors, capable of holding more information than the traditional magnetic stripe. The chip, at its current state of development, can store significantly greater amounts of data, estimated to be 80 times more than a magnetic stripe.

The smart card technology is widely used in countries such as France, Germany, Japan and Singapore to pay for public phone calls, transportation, and shopper loyalty programmes. The idea has taken longer to catch on in the United States, since a highly reliable and fairly inexpensive telecommunications system has favoured the use of credit and debit cards.

Smart cards are basically of two types: relationship-based smart credit cards and electronic purses. Electronic purses, which replace money, are also known as debit cards and electronic money.

The benefits of smart cards will rely on the ubiquity of devices called smart card readers that can communicate with the chip in a smart card. In addition to reading from and writing to smart cards, these devices can also support a variety of key management methods. Some smart-card readers combine elements of a personal computer, a point-of-sale terminal, and a phone to allow consumers to quickly conduct financial transactions without leaving their homes.

In the simplest form, the card reader features a two-line with a 16-character display that can show both the prompt and the response entered by che user. Efficiency is further enhanced by colour-coded function keys, which can be programmed to perform the most frequently used operations in a single key stroke. It can communicate via an RS-232 serial interface with the full range of transaction automation systems, including PCs and Electronic Cash Registers (ECRs).

Card readers in the form of screen phones are becoming more prominent. Proponents of screen phone applications have long stated that consumers, familiarity with phones gives screen phones an entry that computers cannot match. Some screen-based phones feature a four-line screen, a magnetic stripe card reader, and a phone keypad that folds away to reveal a keyboard for use in complex transactions. The phone prompts the users for transactions, using menus patterned on those found on automated teller machines.

Smart card readers can be customized for specific environments. The operating environment allows programmers to use the C programming language to create and modify applications without compromising the device's security functions.

The development system for most card readers even comes with pre-coded modules for accelerated application development. To promote smart card usage, the Smart Card Forum—a group of about 130 businesses and government agencies is drawing up common specifications to promote the use of multiple application smart cards useable for every kind of payments.

Micropayment Systems

VISA Cash of Visa International :-

Visa International, the world's largest credit card company, introduced their own stored value card (VISA Cash) in 1995 under license from and incorporation of the technology developed by Danmont in Denmark.

In the system of VISA Cash, the transaction is made on an existing financial network of Visa, where large value payments are also transacted. The level of security is quite high. However, as all transaction data go through the data centres of Visa International, anonymity could be jeopardized.

The transactions handled here are different from transactions by credit card. The user's identification and authentication are not required at the time of payment. Each bank

does clearing of units of prepayment and deposit; thus the person concerned cannot be identified. In this manner, it provides anonymity. The operational cost is relatively high, since all transactions pass through the network for settlement at banks.

Mondex of MondexInternational :-

We will now explore the system of Mondex which has been developed by National Westminster Bank (hereafter, Nat West Bank), a major commercial bank in Britain.

In December 1993. Nat West Bank announced an electronic low value payment system. calledMondex. Mondex can be classified as a cash substitution system using smart cards, which in a sense is the same as VISA Cash, but the concept is notably different. In the Mondex system, there is one issuing body—the originator of electronic value in the currency of the country.

This originator basically serves as an issuing bank in the Mondex system and issues to the Mondex member banks, the equivalent amount of electronic Mondex Value in exchange for prime negotiable instruments or cash. Consumers as cardholders load Mondex value on their card from a bank ATM, or a Mondex telephone.

It can then be used as cash for shopping. Using a wallet, which resembles a pocket calculator, customers can also exchange electronic value between individuals. Therefore, once the electronic value has been drawn from a bank, only the person involved in the transaction knows the history of the monetary movement.

No one else can trace it. In addition, using a private or a public telephone connected to the Mondex system. the electronic value can be withdrawn, deposited, or sent to a person at a remote location over the telephone network. By adding reader/writer functions to a personal computer, it will also be possible to send money over the Internet.

Properties of Electronic Cash (E-cash)

There are many ways of implementing an e-cash system. 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), a bank-authorized credit, or a bank-certified cashier's cheque. When e-cash created by one bank is accepted by other, 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. In practice, multiple banks are required with an international clearing house that handles the excharige ability issues because all customers are not going to use 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 a 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 travelling.

The cash could be stored on a remote computer's memory, in smart cards, or in other easily transported standard or special-purpose devices. Since it is easy to create counterfeit cash that is stored in a computer, it is preferable that cash is stored 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—à 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 or not. 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 is multiple banks are involved in the transaction. For this reason, most systems rely on post-fact detection and punishment.

E-cash in Action :-

E-cash is based on cryptographic systems called digital signatures. This method involves a pair of numeric keys (very large integers or numbers) that work in tandem: one for locking (or encoding), and the other for unlocking (or decoding).

Messages encoded with one numeric key can only be decoded with the other numeric key and none other. The encoding key is kept private and the decoding key is made public.

By supplying all customers (buyers and sellers) with its public key, a bank enables customers to decode any message (or currency) encoded with the bank's private key.

If decoding by a customer yields a recognizable message, the customer can be fairly confident that only the bank could have encoded it. These digital signatures are as secure as the mathematics involved and have proved $o$ver the past two decades to be more resistant to forgery than handwritten signatures.

Before e-cash can be used to buy products or services, it must be procured from a currency server.

Purchasing E-cash from Currency Servers :-

The purchase of e-cash from an online currency server (or bank) involves two steps: (i) establishment of an account, and (ii) maintaining enough money in the account to back the purchase. Some customers might prefer to purchase e-cash with paper currency, either to maintain anonymity or because they do not have a bank account.

Currently, in most e-cash trials, all customers must have an account with a central online bank. This is too restrictive for international use and multicurrency transactions, for customers should be able to access and pay for foreign services as well as local services. To support this access, e-cash must be available in multiple currencies backed by several banks.

A service provider in one country could then accept tokens of various currencies from users in many different countries, redeem them with their issuers, and have the funds transferred back to banks in the local country.

A possible solution is to use an association of digital banks similar to organizations like VISA to serve as a clearing house for many credit card issuing banks.

And finally, consumers use the e-cash software on the computer to generate a random number, which serves as the "note". In exchange for money debited from the

customer's account, the bank uses its private key to digitally sign the note for the amount requested, and transmits the note back to the customer.

The network currency server, in effect, is issuing a "bank note" with a serial number and a dollar amount. By digitally signing it, the bank is committing itself to back that note with its face value in real dollars.

This method of 'note' generation is very secure, as neither the customer (payer) nor the merchant (payee) can counterfeit the bank's digital signature (analogous to the watermark in paper currency).

Payer and payee can verify the validity of the payment since each knows the bank's public key. The bank is protected against forgery, the payee against the bank's refusal to honour a' legitimate note, and the user against false accusations and invasion of privacy.

How does this process work in practice? In the case of DigiCash, every person using e-cash has an e-cash account at a digital bank (First Digital Bank) on the Internet. Using that account, people can withdraw and deposit e-cash.

When an e-cash withdrawal is made, the PC of the e-cash user calculates how many digital coins and of what denominations are needed to withdraw the requested amount. Next, random serial numbers for those coins will be generated and the blinding (random number) factor will be included.

The result of these calculations will be sent to the digital bank. The bank will encode the blinded numbers with its secret key (digital signature) and at the same time debit the account of the client for the same amount.

The authenticated coins are sent back to the user and finally the user will take out the blinding factor that he or she introduced earlier. The serial numbers plus their signatures are now digital coins whose value is guaranteed by the bank.

E-cash can be completely anonymous. Anonymity allows freedom of usage to buy illegal products, such as drugs or pornographic material, or to buy legal products and services. This is accomplished in the following manner.

When the e-cash software generates a note, it masks the original number or "blinds" the note using a random number and transmits it to a bank.

The "blinding" carried out by the customer's software makes it impossible for anyone to link the payment to the payer. Even the bank cannot compare the signature with

that of the payment, since the customer's original note number was blinded when it was signed.

In other words, it is a way of creating anonymous, untraceable currency, What makes it even more interesting is that the users can prove unequivocally that they did or did not make particular payment. This allows the bank to sign the "note" without even actually knowing how the issued currency will be used.

Using the Digital Currency :-

Once the tokens are purchased, the e-cash software on the customer's PC stores digital money undersigned by a bank. The user can spend the digital money at any shop accepting e-cash, without having to open an account there or having to transmit credit card numbers, As soon as the customer wants to make a payment, the software collects the necessary amount from the stored tokens.

Two types of transactions are possible: *bilateral* and *trilateral.* Typically, transactions involving cash are bilateral or two-party (buyer and seller) transactions, whereby the merchant checks the veracity of the note's digital signature by using the bank's public key.

If satisfied with the payment, the merchant stores the digital currency on his machine and deposits it later in the bank to redeem the face value of the note. Transactions involving financial instruments other than cash are usually trilateral or three-party (buyer, seller, and bank) transactions, whereby the "notes" are sent to the merchant, who immediately sends them directly to the digital bank.

The bank verifies the validity of these "notes" and that they have not been spent before. The account of the merchant is credited. In this case, every "note" can be used only once.

In many business situations, the bilateral transaction is not feasible because of the potential for double spending, which is equivalent to bouncing a cheque. Double spending becomes possible because it is very easy to make copies of the e-cash, forcing banks and merchants to take extra precautions.

To uncover double spending, banks must compare the notes passed on to it by the merchant against a database of spent notes. Just as paper currency is identified with a unique serial number, digital cash can also be protected.

The ability to detect double-spending has to involve some form of registration so that all "notes" issued globally can be uniquely identified. However, this method of matching notes with a central registry has problems in the online world. For most systems which handle high volumes of micropayments, this method would simply be too expensive.

In addition, the problem of double-spending means that banks have to carry added overhead because of the constant checking and auditing of logs.

Double spending would not be a major problem if the need for anonymity is realized. In such situations, when the consumer is issued a bank note, it is issued to that person's unique license.

When he or she gives it to someone else, it is transferred specifically to that other person's license. Each time the money changes hands, the previous owner adds a tiny bit of information to the bank note, based on the bank note's serial number and his or her license. If somebody attempts to spend money twice, the bank will now be able to use the two bank notes to determine who the cheater is.

Even if the bank notes pass through many different people's hands, the culprit will get caught, and none of the other people will ever come to know of it.

The downside is that the bank can tell precisely what your buying habits are since it can check the numbers on the e-cash and the various merchant accounts that are being credited: Many people feel uncomfortable, letting others know this personal information.

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 electronic coins" of various denominations is cumbersome in communication and storage.

To overcome this problem, customers are issued a single number called an "open cheque", 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 cheque".

Operational Risk and E-cash :-

Operational risk associated with e-cash can be mitigated by imposing constraints, such as limits on (i) the time over which a given electronic money is valid, (ü) the amount than can be stored on and transferred by electronic money, (iii) the number of exchanges that can take place before money needs to be re-deposited with a bank or a financial institution, and (iv) the number of such transactions that can be made during a given period of time.

Legal Issues and E-cash :-

Electronic cash will force bankers and regulators to make tough choices that will shape the form of lawful commercial activity related to e-commerce. As a result of the very features that make it so attractive to many, cash has occupied an unstable and an uncomfortable place within the existing taxation and law enforcement systems.

Anonymous and virtually untraceable cash transactions today occupy a place in a kind of underground economy. This underground economy is generally confined to relatively small-scale transactions because paper money in large quantities is cumbersome lo use and manipulate, organized crime being the obvious exception.

As long as the transactions are small in monetary value, they are tolerated by the government as an unfortunate but largely insignificant by-product of the modern commercial state.

As transactions get larger, the government becomes more suspicious and enlists the aid of the banks through the various currency reporting laws in reporting large disbursements of cash, so that additional oversight can be ordered.

Consider the impact of e-cash on' taxation. Transaction-based taxes (e.g. sales taxes) account for a significant portion of state and local government revenue.

But if e-cash really is made to function the way that paper money does, payments we would never think of making in cash-to buy a new car, or as a down payment on a house-could be made in this new form of currency, because there would be no problem of bulk and no risk of robbery.

The threat to the government's revenue flow is a very real one, and officials in government have started to take cognizance of this development and prepare their responses.

To prevent an underdeveloped economy, the government through law, may prevent a truly anonymous and untraceable e-cash system from developing. Just as powerful encryption schemes permit the design of untraceable e-cash systems, so too, do powerful electronic record-keeping tools permit the design of traceable systems-systems in which all financial transactions are duly recorder! in some database, allowing those with access to know more about an individual than anyone could know today.

Anything that makes cash substantially easier to use in a broader range of transactions, holds the potential to expand this underground economy to proportions posing ever more serious threats to the existing legal order.

Under the most ambitious visions of e-cash, we can see a new form of currency that could be freely passed off from one computer to another with no record, yet incapable of being forged.

A consumer can draw such e-cash electronically from his or her bank. The bank has a record of that transaction, just as a withdrawal or a cheque is recorded now. But after that, the encrypted e-cash file could be handed off without the knowledge of anyone but the parties involved in the transaction.

However, as politics and business play their role, technology is forcing legal issues to be reconsidered. The question e-cash poses is not, "Should the law take notice of this development?"' but rather, "How can it not?" By impacting revenue-raising capabilities, e-cash cannot escape government scrutiny and regulation; but it is going to take some serious thinking to design a regulatory scheme that balances personal privacy, speed of execution, and ease of use.

Without a functioning system, what the government will do, remains a mystery. Moreover, it is not even clear yet that the markets as a whole will adopt an anonymous e-cash standard.

Cheque Payment Systems on the Internet:-

Magnetic Ink Character Recognition (MICR) :-

In this system, data are printed at the bottom of cheques in magnetic ink, for an electronic read is a typical use of electronics for cheque processing.

Check Free Payment Services of Check Free:-

In September 1995, *CheckFree* offered the electronic cheque service CheckFree Payment Services on the Internet. Upon customer request, this service issues an electronic cheque and executes settlement between customer and retailer. If needed, à paper cheque can also be issued to the retailer. This system implements not only cheque processing but also electronic cheque issuance.

Electronic Cheque (E-cheque):-

FSTC is a consortium of 60 organizations in the US including financial institutions, clearing houses, universities, and companies. It was founded in 1993 for the development of payment systems for E-commerce (EC). Bank of America, Citibank, and Chemical Bank are a few of the well-known participants.

In September 1995, FSTC commenced an electronic cheque system on the Internet called electronic cheque. This is one of FSTC's five major development projects, the others being

1. Cheque truncation
2. Electronic commerce
3. Security measures
4. Smart card system.

In this electronic cheque system, a consumer possesses an electronic chequebook on a Personal Computer Memory Card International Association (PCMCIA) card. As needed cheques are written electronically from the e-chequebook on the card. They are then se over the Internet to the retailer, who in turn sends the e-cheques to the customer's bank Settlement is made through a financial network such as an ACH.

In addition to payment data commercial data such as invoice number and date of receipt can be enumerated, thereby achieving a higher degree of efficiency by eliminating duplication. With a view to increasing the practicality of the system, FSTC is experimenting with the adoption of a smart card an electronic cheque-book. An electronic signature with public key encryption has been adopted by FSTC for ensuring data security over the Internet.
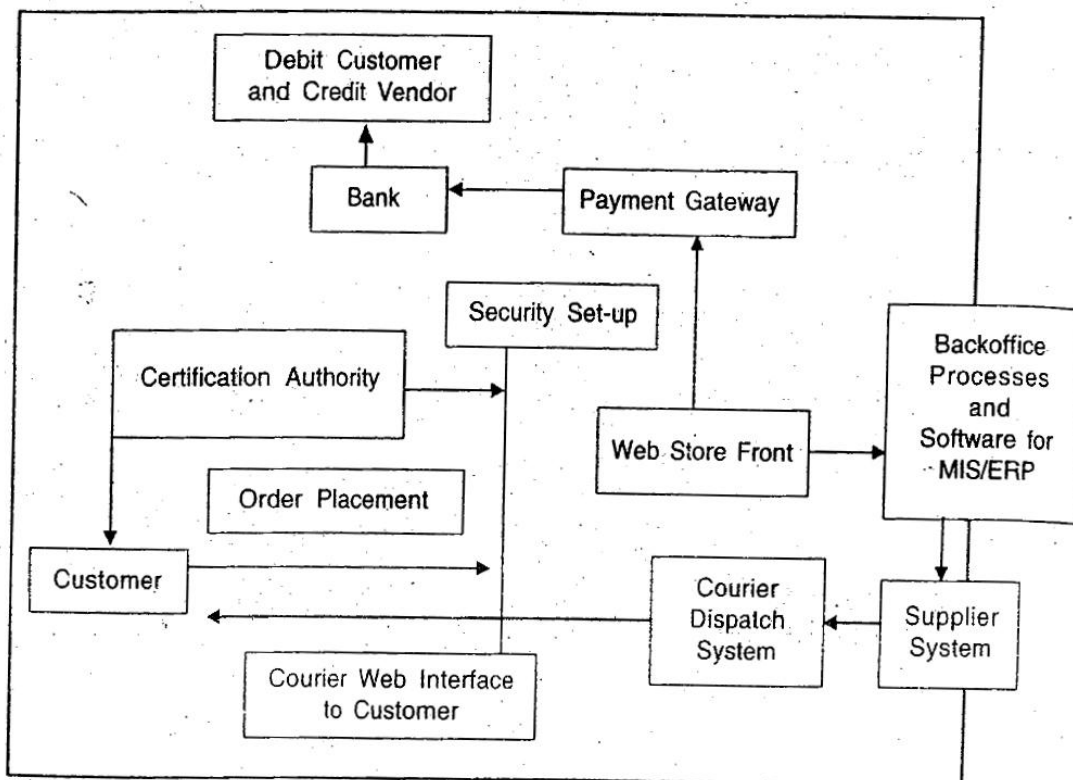
Risk and E-payment Systems:-

In Figure 6.1, the risks of e-commerce model are shown. There are three major risks: 1. Data Protection-The abuse of data related to users

2. Data Reliability-The authentication of parties involved

3. Taxation-Issues related to tax.

Related to the above main issues is the type of legal framework in which this model work Fraud, financial misdemeanours, and tax avoidance are not found just in electronic commerce, but e-commerce presents new ways to commit old crimes. Electronic commerce is difficult to regulate for two main reasons:

1. The scope of electronic commerce, and the technology involved changes rapidly traditionally, the formulation of the law has been an evolutionary process, adapting to suit the needs of society. Where electronic commerce is concerned, the pace of change is and has been too great for this process to take place. This result in a situation where there is a choice of either applying current legislation or enacting new legislation specifically formulated to meet the challenge of electronic commerce

2. The very nature of the technology involved means that it is transnational. This leads to problems as to which legal-system has jurisdiction over e-commerce transactions

Fig. 4.1 Risk and e-payment systems.

Data Protection:-

Although the number of businesses on the Internet has grown, many of these organizations are simply maintaining a 'Web presence? by providing information about themselves and their products, and have not yet undertaken Internet-based transactions. This inertia is probably due to concern about the security of transactions and user authorization.

Technologies concerned with authorization include firewalls, password access, smart cards, and biometrics fingerprinting. However, in order to provide secure electronic transactions (SET), encryption technologies are used.

Encryption technologies, which are supported by the appropriate legal mechanisms, have the potential to allow global electronic commerce to develop.

One essential challenge of e-commerce is risk management. Operation of e-payment systems incurs three major risks: fraud or mistake, privacy issues, and credit risk. Preventing mistakes might require improvements in the legal framework.

Dealing with privacy and fraud issues requires improvements in the security framework Curtailing credit risk requires devising procedures to constrict or moderate credit and reduce float in the market.

Risks from Mistake and Disputes: Consumer Protection:-

Virtually, all e-payment systems need some ability to keep automatic records, for obvious reasons. From a technical standpoint, this is not a problem for electronic systems. Credit and debit cards have them, and even the paper-based cheque creates an automatic record.

Once information has been captured electronically, it is easy and inexpensive to keep it might even cost more to throw it away than to keep it). For example, in many transaction processing systems, old or blocked accounts are never purged and old transaction histories can be kept forever on magnetic tape.

Given the intangible nature of electronic transactions and dispute resolution relying solely on records, a general law of payment dynamics and banking technology might be that no data need ever be discarded.

The record feature is an after-the-fact transcription of what happened, created without any explicit effort by the transaction parties. Features of these automatic records

include: (i) permanent storage, (ii) accessibility and traceability, (iii) a payment system database, and (iv) data transfer to payment maker, bank, or monetary authorities.

The need for record keeping for purposes of risk management conflicts with the transaction anonymity of cash. One can say that anonymity exists *t*oday only because cash is a very old concept, invented long before the computer and networks gave us the ability to track everything.

Although a segment of the payment-making public always desire transaction anonymity, many believe that anonymity runs counter to the public welfare because too many tax, smuggling, and∕or money laundering possibilities exist. The anonymity issue raises the question: can e-payments be done without an automatic record feature?

Many recent payment systems seem to be ambivalent on this point. For instance, the Mondex electronic purse touts equivalence with cash, but its electronic wallets are designed to hold automatic records of the card's last twenty transactions with a built-in statement.

Obviously, the card-reading terminals, machines, or telephones could maintain records of all transactions. With these records, the balance on any smart card could be reconstructed after the fact, thus allowing additional protection against loss or theft. This would certainly add some value versus cash.

Managing Information Privacy :-

The e-payment system must ensure and maintain privacy. Every time one purchases goods using a credit card, subscribes to a magazine, or accesses a server, that information goes into the database.

Furthermore, all these records can be linked so that they constitute in effect, a single dossier. This dossier would reflect what items were bought, and *w*here and when. This violates the unspoken law of doing business, that privacy of customers should be protected as much as possible.

Managing Credit Risk :-

Credit or systemic risk is a major concern in net settlement systems, because a bank's failure to settle its net position could lead to a chain reaction of bank failures. The digital central bank must develop policies to deal with this possibility. Various alternatives exist, each with advantages and disadvantages.

A digital central bank guarantee on settlement removes the insolvency test from the system because banks will more readily assume credit risks from other banks. Without such guarantees, the development of clearing and settlement systems and money markets may be impeded.

A middle road is also possible: for example, setting controls on bank exposures (bilateral or multilateral) and requiring collateral. If the central bank does not guarantee settlement, it must define, at least internally, the conditions and terms for extending liquidity to banks in connection with settlement.

Designing E-payment Systems :-

Despite cost and efficiency gains, many hurdles need to be overcome for the spread of e-payment systems. These include several factors, mostly non-technical in nature, that must be addressed before any new payment method is made successful. They are as follows:

1. **Privacy.** A user expects trustworthiness of a secure system; just as the telephone is a safe and a 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. Tomorrow's bank robbers will need no getaway cars-just a computer terminal, the price of a telephone call, and a little ingenuity. Millions of dollars have been embezzled by computer fraud. No systems are yet foolproof, although designers are concentrating closely on security.

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. Separate accounts are stored on separate databases. The challenge before banks is to tie these databases together and 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 papers 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 also substantial ongoing operational subsidies will be necessary. On the other hand, it must be recorded that, without subsidies, it is difficult to fix up an affordable price to all services.

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 the above hurdles are insurmountable. Most of these will be overcome 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) a less-cash world.

The Key to Security: Cryptography :-

Cryptography relies on two basic components: an algorithm (or cryptographic methodology) and a key. Algorithm is the method used to encrypt the message, and key is the object used to decrypt the message. For instance, in a system where letters are substituted for other letters, the "key" is the chart of paired letters and algorithm is the substitution.

In modern cryptographic systems, the algorithms are complex mathematical formulae, and keys are strings of bits. If two parties want to communicate, they must use the same algorithm. In some cases, they must also use the same key. Many cryptographic keys must be kept secret. Sometimes algorithms are also kept secret, as the method of encryption may hold the very method used to decrypt the message.

Cryptosystems are being increasingly used in encryption, authentication, integrity; non-repudiation, and management of other crypto systems like key management. A crypto system is a mathematical function for processing data, and there is nothing secret about the function except the key.

Examples of Encryption Techniques :-

Caesar's Method :-

         This is one of the oldest known techniques of encryption. It traces its history back to Roman times. It is a really simple method of encrypting a message. It involves shifting each letter of the message to a letter that appears k letters after it. In the method that was first devised by the Romans, k was equal to 3. What this meant was that each letter was shifted 3 places to the right. For example, 'A' would be transformed to 'D', 'B' to 'E', 'C' to 'F', and so on.

         So, starting with ABCDEFGHIJKLMNOPQRSTUVWXYZ and sliding everything up by 3, you get DEFGHIJKLMNOPQRSTUVWXYZABC where, D = A, E = B, F = C, and so on. Using this scheme, the plain text "SECRET" encrypts as "VHFUHW". To enable someone else to read the cipher text, you tell him or her that the key is 3. This is clearly a secret key system, the secret key being the value of k. Clearly, this is not a very safe system of encryption, as, trying all possible values of k, namely 1 through 26, can easily crack it.

Letter Pairing :-

         This method is similar to Caesar's method. Here, instead of shifting each letter to some places to its right, letters are paired off with each other in a random manner. For example, consider the pairing A , B Y, C X , and so on.

         The method overcomes the limitation of Caesar's method and cannot be encrypted even by using various values of k. Yet, this is not a safe method at all, and can easily be decrypted by using techniques such as frequency analysis. If a large enough messages is intercepted, then by counting the number of times a letter appears, the third party can judge which letter stands for which by comparing the data with the average frequencies of usage of letters of the language. For example, we know that 'E' is the most often used letter, and hence the most repeated letter would probably stand for 'E'.

         The two examples given above are simple yet interesting encryption techniques. In the following few pages, we will discuss some of the latest and most widely used encryption techniques.

RSA :-

RSA stands for Rivest; Shamir and Adleman—the three cryptographers who invented the first practical commercial public key cryptosystem. Today it is used in Web browsers, e-mail programs, mobile phones, virtual private networks, secure shells, and many other places. With sufficiently large keys, you can be confident of foiling the vast majority of attackers.

Until recently, the use of RSA was very much restricted by patent and export laws. However, the patent has now expired and US export laws have been relaxed. RSA encryption uses large prime numbers for its purposes.

It works on the basic fact that large numbers are extremely difficult to factorize. If we take the product of two arbitrarily large (but secret) prime numbers of say, 50 digits each and multiply them, then using the most current supercomputing technology it would take more than a thousand years to factorize them. This method has brought to the fore a branch of mathematics called 'number theory that is till now considered to have no practical applications.

RSA uses two large prime numbers. Numbers must be quite large in length, 100 to 300 bits, and must have a prime value. Only the person who wants to decrypt the message should know these. Using these, a mathematical algorithm is developed which produces a public key. Anyone who wants to encrypt a message uses this algorithm. The key is based on the two large primes used, and is known only to the person who has developed the particular algorithm.

RSA seems to be a reliable and a fast algorithm, but the serious persisting flaws consist of the hiding of two initial numbers chosen from the IP table. Once discovered, intruders can use these numbers to reconstruct the message and the keys.

DES :-

This is an example of a widely used secret key encryption system. In 1972, the National Institute of Standards and Technology (NIST) decided that a strong cryptographic algorithm was needed to protect non-classified information. The algorithm was required to be cheap, widely available, and very secure.

NIST envisioned something that would be available to the general public and could be used in a wide variety of applications. So they asked for public proposals for

such an algorithm. In 1974, IBM submitted the Lucifer algorithm, which appeared to meet most of NIST's design requirements.

The modified Lucifer algorithm was adopted by NIST as a federal standard on November 23, 1976. Later its name was changed to Data Encryption Standard (DES). The algorithm specification was published in January 1977, and with the official backing of the government it became a very widely employed algorithm in a short time.

DES encrypts and decrypts data in 64-bit blocks, using a 64-bit key (although the effective key strength is only 56 bits, as explained below). It takes a 64-bit block of plain text as input, and outputs a 64-bit block of cipher text. It always operates on blocks of equal size, and it uses both permutations and substitutions in the algorithm.

Unfortunately, over time, various short cut attacks were found that could significantly reduce the time needed to find a DES key by brute force. And as computers became progressively faster and more powerful, it was recognized that a 56-bit key was simply not large enough for high security applications.

As a result of these serious flaws, NIST abandoned their official endorsement of DES in 1997 and began work on a replacement, to be called the Advanced Encryption Standard (AES). Despite the growing concerns about its vulnerability, DES is still widely used by financial services and other industries worldwide to protect sensitive online applications.

Attacks on Crypto Systems :-

One of the most important perspectives of key management is to prevent attacks or to make attacks practically infeasible. Theoretically, all crypto systems are susceptible to direct key search attacks and, from a theoretical perspective, all keys are breakable. But from a practical point of view, this is not always the case for most of the widely used crypto systems around. There are basically two types of crypto systems:

Symmetric Key Crypto Systems :-

This is historically known as the *secret key system*. In this crypto system, the key for the underlying mathematical function can be used to reverse this mathematical function (hence symmetric').

There are two types of symmetric key crypto systems: 'stream ciphers are used in mobile communication, and 'block' ciphers are used for encryption/authentication.

Examples of some block ciphers are Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), and SAFER.

Symmetric systems are built by repeatedly using simple mathematical operation involving the key. Thus, they can be executed at a high speed. These crypto systems" find their use in systems where a large amount of data is processed.

Asymmetric Key Crypto Systems:-

This is also known as *public key system.* The key for the underlying mathematical function cannot be easily used to reverse the mathematical function: A separate key is required to do this (hence the name 'asymmetric'). Participants in such a system will have a key pair public and private key.

This system is based on a one-way mathematical function-easy in one direction but very difficult to reverse, as for example, multiplying two large numbers is easy but factorizing this product can be very difficult. Diffie-Hellman, RSA, El Gamal are based on this theory.

Asymmetric key crypto systems are flexible to implement as compared to secret key systems, but are much slower to execute. This system is widely used in digital signature, key management, and entity authentication.

A Matter of Keys :-

The key for any crypto system is a string of binary digits (bits) that holds information. For a symmetric system, a key is usually a given length of binary string, and any binary string of this length can be a valid key. For example, DES has a 56-bit key (in fact 64, of which 8 are parity check bits). So, any bit string of length 56 can be a DES key.

For asymmetric systems also, the key is a string of binary digits but all such strings are not valid keys. Some RSA versions use 512-bit keys, but every possible 512-bit key is not a valid key. For example, even numbers are not valid. Key lengths of symmetric and asymmetric keys are not directly comparable, and techniques for finding out unknown keys are different for the two systems.

In symmetric system, the technique for finding unknown key for block and stream ciphers is the same. For block ciphers, key can usually be of any binary string of given size. For example, DES has a 56-bit key, Triple DES has a 112-bit key, and it is 128-bit

for IDEA and SAFER. So DES has 256 possible keys, triple DES has *2*,112 possible keys, and .JDEA and SAFER have 2,128 possible keys.

For some data processed by block ciphers, one has to try all possible keys until one finds out a small collection of keys that work. One of these keys would be the unknown key. This form of attack is known as a brute force attack/exhaustive key search and requires a. minimum of information to perform such an attack.

The objective for strong block .cipher design is to ensure that exhaustive key search takes far longer time and is far more expensive than it is feasible, and that there is no other way of getting the unknown key more quickly and more cheaply than exhaustive search. The complexity of such an attack is quantified by comparing the number of applications of the block cipher in the attack with an exhaustive key search.

Even in cases where the attack compares. Favourably, there are other points to be considered, such as the amount of data that needs to be processed by the block cipher with the unknown key. While such attacks are specific to the block ciphers, there are two types of attack that have wide applicability: differential cryptanalysis, and linear cryptanalysis.

Some carefully chosen data are processed by the block cipher to be analyzed to find the unknown key in differential cryptanalysis. In linear cryptanalysis, the underlying algebraic structure is used to analyze data processed by the block cipher.

For the widely used block ciphers such as DES, these attacks are currently impractical, as they require the generation of vast amount of data with the unknown ke*y*. For example, differential attack on DES requires the processing of *2*50 bytes of data and a linear- attack, requires processing of 246 bytes of data.

Exhaustive Search:

An exhaustive attack on a block cipher is very complex. This is because one has to look for all the keys for an exhaustive search, and the larger the number of keys, the harder this is. As an illustration, consider an exhaustive key search for a 56-bit DES key.

An exhaustive key search for a DES key will require 256 tests, which is equal to 7.2 x 1016 tests. Assuming 106 testing devices are employed, each capable of performing 106 tests per second, the complete 'test cycle will require 7.2 x 104 seconds, which is equivalent to 20 hours.

In such a scenario, the key might be expected in 10 hours. Obviously, computation of such magnitude is beyond the limit of average desktops. Approximate figures for other

block ciphers with different key sizes can be derived by multiplying by an appropriate factor.

Clearly, the feasibility of an attack depends on the computing resources of the attacker. In March 1997, RSA Data Security Inc. issued test challenge DES-I to find a 56-bit DES key (with a $10,000 prize). There were 256 or 72 quadrillion possible DES keys.

The key was found 140 days later by an effort distributed over the Internet. It involved 70,000 Internet addresses, each searching through different keys until the correct one was found. At the peak rate, 7 billion keys were being tested per second. At this rate, it would have taken a minimum of 32 days to find the key.
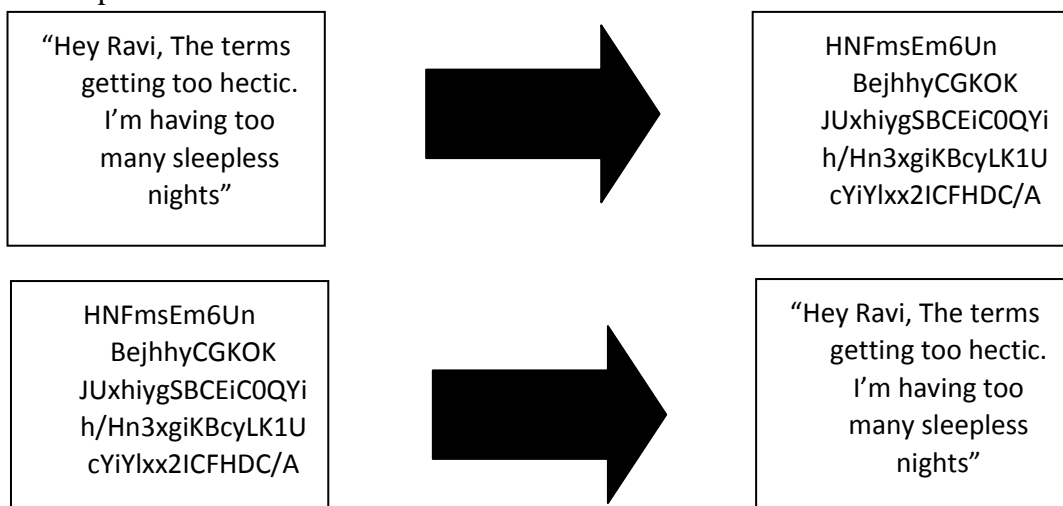
In 1998, RSA DES Challenge II was solved in 56 hours. This time again the effort involved massive computing resource. Electronic Frontier Foundation (EFF) designed DES Breaker at an estimated cost of $80,000. The manufacturing cost of the machine was $130,000.

The complete key search took 220 hours. The peak search rate this time was a massive 90 billion keys per second: The latest DES challenge, DES Challenge III was solved in January last year in 22 hours and 15 minutes. It involved the combined efforts of EFF'S Deep Crack and distributed.net to find the key.

Private Key and Public Key.

In Figure 4.2, the message is encrypted with a public key and sent to the recipient. The recipient opens it with his public key.

For asymmetric key crypto systems, the situation is different. It is generally believed that the difficulty of finding an unknown private key depends upon the difficulty of some well-known mathematical problems. The problem of finding an RSA private key is believed to be equivalent to factorizing a large number that is the product of two large primes. From

| "Hey Ravi, The terms getting too hectic. I'm having too many sleepless nights" | → | HNFmsEm6Un BejhhyCGKOK JUxhiygSBCEiC0QYi h/Hn3xgiKBcyLK1U cYiYlxx2ICFHDC/A |
| HNFmsEm6Un BejhhyCGKOK JUxhiygSBCEiC0QYi h/Hn3xgiKBcyLK1U cYiYlxx2ICFHDC/A | → | "Hey Ravi, The terms getting too hectic. I'm having too many sleepless nights" |

Fig. 4.2 Role of public and private key.

the invention of asymmetric cryptography (mid-1970s) until recently, there were a number of algorithms that could factor such numbers and they all took roughly the same time. In the last few years, a new algorithm—the General Number Field Sieve (GNFS)-has been invented that can factor a number more quickly than the previous algorithms. The discrete algorithm problem used for El Gamal and DSS has a similar complexity.

As with DES, a RSA Data Security challenge number (RSA-130) with 430 bits was issued. This number has been factorized (April 1996), ' again using an effort distributed over the Net. The total effort used in factorizing RSA-130 is believed to be 500 Mipsyears (equivalent to a computer running 500 million instructions per second for a year).

Such figures make it just about conceivable that with concentrated effort distributed over the Net, it is just possible to factorize a 512-bit number as the product of two primes. This means RSA system with-512-bit private keys are potentially vulnerable to such attacks.

In future, increase in computing speed will make it possible to factorize larger-sized numbers. However, it is entirely possible that overnight someone will invent a new algorithm and all the figures will have to be revised.

Although popular media has floated the perception that DES keyspace is so small that it is possible for anyone with a PC to break any DES-based crypto system, it is far from the truth. Well, it is true that 56-bit key is too small; but not for the computing power of a PC. DES is vulnerable when attacked with an immense computing power. Even after AES becomes the new standard, we will see DES in use for some time to come.
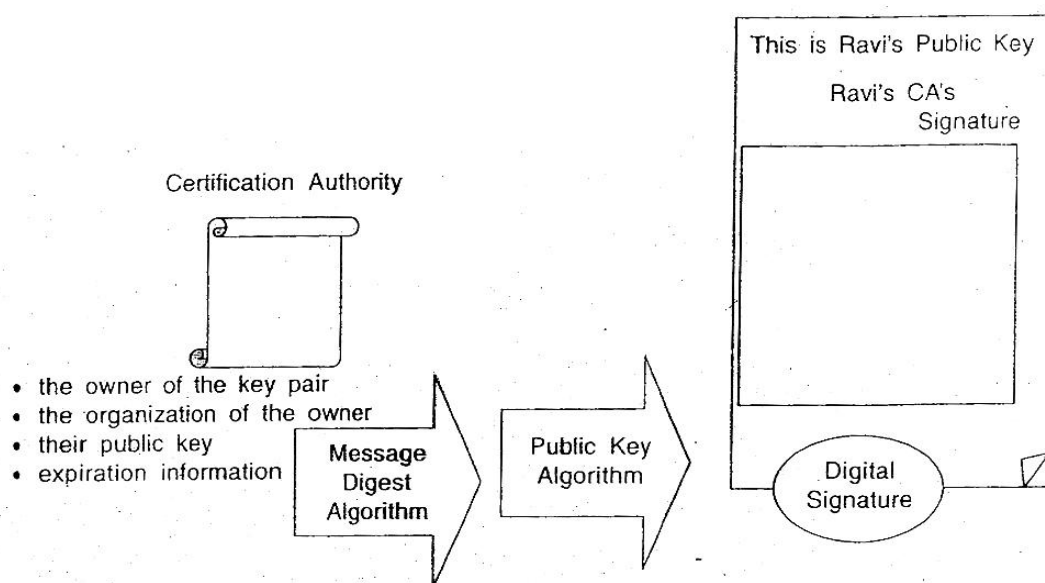
Digital Signature :-

Digital signatures provide information regarding the sender of an electronic document. The technology has assumed huge importance recently, with the realization that it may be the remedy to one of the major barriers to growth of electronic commerce: fear of lack of security. Digital signatures provide data integrity, thereby allowing the

data to remain in the same state in which it was transmitted. The identity of the sender can also be authentication by third parties.

The most widely used type of cryptography is public key cryptography, where the ender is assigned two keys-one public, one private. The original message is encrypted using the public key while the recipient of the message requires the private key to decrypt the message. The recipient can then determine whether the data has been altered. However, although this system guarantees the integrity of the message, it does not guarantee the identity of the sender public key owner). In order to remedy this, a Certificate Authority is required.

In Figure 4.3, Ravi (the sender) uses his private key to compute the digital signature. In order to compute the digital signature, a one-way hashing algorithm may be used to first calculate a message digest, as is done by RSA.

The message digest is an efficient way to represent the message, as well as being a unique number that can only be calculated from the contents of the message. The sender's private key is used at this point to encrypt the message digest. The encrypted message digest is what is commonly called a digital signature.

Fig. 4.3 Digital signature process.

A certification authority (CA) performs the task of managing key pairs, while the verification of the person or entity bound to that key pair is initially ascertained at the time of application by the registration authority. A certificate is issued by a CA and links an individual or entity to its public key, and in some cases to its private key. Certification

authorities can offer different grades of certificates, depending upon the type of initial identification provided by the individual.

From an information security viewpoint, these simple electronic signatures" are distinct from the "digital signatures" and in the technical literature, although "digital signature" is sometimes used to mean any form of computer-based signature. These guidelines use "digital signature" only as it is used in information security terminology, as to mean the result of applying the technical processes. :

Legal Position of Digital Signatures:-

Although the digital signature technology has been available for some time, it has only recently become feasible to use digital signatures to authenticate a document. This breakthrough has made digital signatures one of the most important areas of development within electronic commerce. It is important because the technology and the law governing it must develop in a way that promotes or at the very least does not inhibit--the growth of electronic commerce.

A substantial amount of legislation regulating the use of digital signatures and their legal status has been enacted. So far, this has been enacted on a state by state basis, resulting in those countries taking contrasting legal positions. International law on digital signatures has yet to be formulated.

Developments are also taking place at a global level. Bodies such as the Internet Engineering Task Force (IETF), the International Organization for Standardization (ISO), and W3C are currently working on standardization of digital signatures. The OECD has issued 'Guidelines for Cryptology Policy', which includes a guide for states on the creation of legislation governing the use of digital signatures. UNCITRAL has also released draft legislation on electronic commerce, including guidelines for digital signatures.

Signatures and the Law:-

A signature is not a part of the substance of a transaction, but rather its representation or form. Signing writings serve the following general purposes:

Evidence :-

A signature authenticates the writing by identifying the signee with the signed document. When the signer makes a mark in a distinctive manner, the writing becomes attributable to the signer,

Legality :-

The act of signing a document calls to the signer's attention, the legal significance of the signer's act, and thereby helps prevent "inconsiderate" engagements.

Approval :-

In certain contexts defined by law or custom, a signature expresses the signer's approval or authorization of the writing, or the signer's claim that it has legal validity.

Efficiency and Logistics :-

A signature on a written document often imparts a sense of clarity and finality to the transaction, and may lessen the subsequent need to inquire beyond the face of a document. Negotiable instruments, for example, rely upon formal requirements, including a signature, for their ability to change hands with ease, rapidity, and minimal interruption.

Authenticity:-

The formal requirements for legal transactions, including the need for signatures, vary in different legal systems, and also vary with the passage of time. There is also variance in the legal consequences of failure to cast the transaction in a required form.

The statute of frauds of the common law tradition, for example, does not render a transaction invalid for lack of a "writing signed by the party to be charged", but rather makes it unenforceable in the court, a distinction which has caused the practical application of the statute to be greatly limited in case law.

During this century, most legal systems have reduced the formal requirements, or at least have minimized the consequences of failure to satisfy formal requirements. Nevertheless, sound practice still calls for transactions to be formalized in a manner which assures the parties of their validity and enforceability.

In current practice, formalization usually involves documenting the transaction on paper and signing or authenticating the paper. Traditional methods however, are

undergoing fundamental change. Documents continue to be written on paper, but sometimes merely to satisfy the need for a legally recognized form. In many instances, the information exchanged to effect a transaction never takes paper form. Computer based information can also be utilized differently than its paper counterpart.

For example, computers can "read" digital information, and transform the information or take programmable actions based on the information. Information stored as bits rather than as atoms of ink and paper can travel near the speed of light, may be duplicated without limit and with insignificant cost.

Although the basic nature of transactions has not changed, the law has only begun to adapt to advances in technology. The legal and business communities must develop rules and practices which use new technology, to achieve and surpass the effects traditionally achieved from paper forms.

To achieve the basic purposes of signatures outlined thus, a signature must have the following attributes:

Signer authentication. A signature should indicate who signed a document, a message or a record, and should be difficult for another person to product without authorization.

Document authentication.A signature should identify what is signed, making it impracticable to falsify or alter either the signed matter or the signature without detection.

Signer authentication and document authentication are tools used to exclude impersonators and forgers, and are essential ingredients of what is often called a "non-repudiation service" in the terminology of information security profession.

A non-repudiation service provides assurance of the origin or delivery of data in order to protect the sender against false denial by the recipient that the data has been received, or to protect the recipient against false denial by the sender that the data has been sent.

Thus, a non-repudiation service provides evidence to prevent a person from unilaterally modifying or terminating legal obligations arising out of a transaction effected by computer-based means:

Optimally, a signature and its creation, and its verification processes should provide the greatest possible assurance to both the signer's as well as the document's authenticity with least possible expenditure.

Affirmation :-

The affixing of the signature should be an affirmative act, which serves the ceremonial and approval functions of a signature and establishes the sense of having legally consummated a transaction.

Digital signature technology generally surpasses paper technology in all these attributes. To understand why, one must first understand how digital signature technology works.

How Digital Signature. Technology Works :-

Digital signatures are created and verified by cryptography. Digital signatures use public key cryptography, which employs an algorithm using two different but mathematically related "keys": one for creating a digital signature or transforming data into a seemingly unintelligible form, and another key for verifying a digital signature or returning the message to its original form. Computer equipment and software utilizing two such keys are often collectively termed an "asymmetric crypto system".

The complementary keys of an asymmetric crypto system for digital signatures are arbitrarily termed private key, which is known only to the signer, and used to create the digital signature, and the public key, which is ordinarily more widely known and is used by a relying party to verify the digital signature.

If many people need to verify the signer's digital signatures, the public key must be available or distributed to all of them, perhaps by publication in an online repository or directory, where it is easily accessible. Although the keys of the pair are mathematically related, if the asymmetric crypto system has been designed and implemented securely it is "computationally infeasible" to derive the private key from the knowledge of the public key.

Thus, although many people may know the public key of a given signer and use it to verify that signer's signatures, they cannot discover that signer's private key and use it

to forge digital signatures. This is sometimes referred to as the principle of "irreversibility".

Another fundamental process, termed hash function, is used in both creating and verifying a digital signature. A hash function is an algorithm which creates a digital representation or "fingerprint" in the form of a "hash value" or "hash result" of a standard length which is usually much smaller than the message but nevertheless substantially unique to it.

Any change to the message invariably produces a different hash result when the same hash function is used. In the case of a secure hash function, sometimes termed as a "one-way hash function", it is computationally infeasible to derive the original message from the knowledge of its hash value.

Hash functions therefore enable the software to create digital signatures to operate on smaller and predictable amounts of data, while still providing robust evidentiary correlation to the original message content, thereby efficiently providing assurance that there has been no modification of the message since it was digitally signed.

Thus, the use of digital signatures usually involves two processes--one performed by the signer, and the other by the receive, of the digital signature. They can be discussed as follows:

Digital Signature Creation :-

This uses a hash result derived from and unique to both the signed message and a given private key. For the hash result to be secure, there must be only a negligible possibility that the same digital signature could be created by a combination of any other message and a private key.

Digital Signature Verification :-

This is the process of checking the digital signature by reference to the original message and the given public key, thereby determining whether the digital signature was created for that same message using the private key corresponding to the referenced public key.

To sign a document or any other item of information, the signer first delimits precisely the borders of what is to be signed. The delimited information to be signed is

termed "message" in these guidelines. Then a hash function in the signer's software computes a hash result unique (for all practical purposes) to the message.

The signer's software then transforms the hash result into a digital signature using the signer's private key. The resulting digital signature is thus unique to both the message and the private key used to create it.

Typically, a digital signature (a digitally signed hash result of the message) is attached to its message and stored or transmitted with its message. However, it may also be sent or stored as a separate data element, so long as it maintains a reliable association with its message. Since a digital signature is unique to its message, it is useless if it is wholly disassociated from its message.

Verification of a digital signature is accomplished by computing a new hash result of the original message by means of the same hash function used to create the digital signature. Then, using the public key and the new hash result, the verifier checks: (i) whether the digital signature was created using the corresponding private key, and (ü) whether the newly computed hash result matches the original hash result which was transformed into the digital signature during the signing process. The verification software will confirm the digital signature as "verified" if: (i) the signer's private key was used to digitally sign the message, which is known to be the case if the signer's public key was used to verify the signature because the signer's public key will verify only a digital signature created with the signer's private key, and (ii) the message was unaltered, which is known to be the case if the hash result computed by the verifier is identical to the hash result extracted from the digital signature during the verification process.

Various asymmetric cryptosystems create and verify digital signatures using different algorithms and procedures, but share this overall operational pattern.

The processes of creating a digital signature and verifying it, accomplish the essential effects desired of a signature for many legal purposes:

Signer Authentication :-

If a public and a private key pair is associated with an identified signer, the digital signature attributes the message to the signer. The digital signature cannot be forged, unless the sign loses control of the private key (a "compromise" of the private key), such

as bydivulging (i.e. Private or sensitive information) it or losing the media or device in which it is contained.

Message Authentication :-

The digital signature also identifies the signed message, typically with far greater certain and precision than paper signatures. Verification reveals any tampering, since the comparison of the hash results (one made at signing and the other made at verifying) shows whether message is the same as when signed.

Affirmative Act :-

Creating a digital signature requires the signer to use the signer's private key. This act perform the "ceremonial" function of alerting the signer to the fact that the signature consummating a transaction with legal consequences.

Assurance :-

The processes of creating and verifying a digital signature provide a high level of assurance that the digital signature is genuinely the signer's. As with the case of modern Electronic Data Interchange (EDI), the creation and verification processes are capable of complete automation (sometimes referred to as machinable), with human interaction required only in exceptional cases. Compared to paper methods such as checking specimen signature cards methods so tedious and laborious that they are rarely used in practice-digital signature yield a high degree of assurance without adding greatly to the resources required for processing.

The processes used for digital signatures have undergone thorough technological peer review for over a decade. Digital signatures have been accepted in several national and international standards developed in cooperation with, and accepted by many corporations, banks, and government agencies. The likelihood of a malfunction or a security problem in a digital signature cryptosystem designed and implemented as prescribed by the industry standards is extremely remote and is far less than the risk of undetected forgery or alteration on paper or of using other less secure electronic signature techniques.

Some of the websites which use digital signatures are given in Table 6.8.

TABLE 4.8
INDIAN WEBSITES THAT USE DIGITAL SIGNATURE

Shopping and Auctions sites	SifyMall Bazee Fabmall Rediff
Bookings and Reservations	All major airlines Indian Railways
Service Companies e-payments	Celluar Providers. ISPs
Net Banking	ICICI HDFC

Following is the list of certifying authorities in India

- SafeScrypt (A Sify-Verisign venture) was the first CA in India.

- National Informatics Centre:

- Tata Consultancy Services.

- Institute of Development and Research in Banking Technology, Hyderabad (IDRBT), the technology arm of the Reserve Bank of India.

- Mahanagar Telephone Nigam Ltd (MTNL).

- ICICI Infotech, which has the contract for the supply and installation of the National Root Certification Authority, with an aim to bring uniformity amongst the different : certifying authorities in India.

Public Key Certificates

To verify a digital signature, the verifier must have access to the signer's public key and have assurance that it corresponds to the signer's private key. However, a public and a private key pair have no intrinsic association with any person; it is simply a pair of numbers. . Some convincing strategy is necessary to reliably associate a particular person or entity to the key pair.

In a transaction involving only two parties, each party can simply communicate (by a:. relatively secure "out-of-band" channel, such as a courier or a secure voice telephone) the public key of the key pair each party will use.

Such an identification strategy is no small task, especially when the parties are geographically far away from each other, conduct communication over a convenient but insecure channel such as the Internet, are not individuals. But rather corporations or similar artificial entities, and act through agents whose authority. Need to be ascertained.

As electronic commerce increasingly moves from a bilateral setting to the many-on-many architecture of the World Wide Web on the Internet, where significant transactions will occur among strangers who have no prior contractual relationship and will never deal with each other again, the problem of authentication/no repudiation becomes not merely one of efficiency, but also of reliability. An open system of communication, such as the Internet; needs a system of identity authentication to handle this scenario.

To that end, a prospective signer might issue a public statement, like: "Signatures verifiable by the following public key are mine." However, others doing business with the signer may for good reason be unwilling to accept the statement, especially where there is no prior contract establishing the legal effect of that published statement with certainty. A party relying upon such an unsupported published statement in an open system would run Na great risk of trusting a phantom or an imposter, or of attempting to disprove a false denial of a digital signature (non-repudiation), if a transaction should turn out to prove disadvantageous for the purported signee.

The solution to these problems is the use of one or more trusted third parties to associate an identified signer with a specific public key. That trusted third party is referred to as a certification authority in most technical standards and in these guidelines.

To associate a key pair with a prospective signer, a certification authority issues a certificate, an electronic record which lists a public key as the "subject" of the certificate, and confirms that the prospective signee identified in the certificate holds the corresponding private key.

The prospective signee is called the subscriber. The certificate's principal function is to bind a key pair with a particular subscriber. A recipient of the certificate desiring to rely upon a digital signature created by the subscriber named in the certificate (whereupon the recipient becomes a relying party) can use the public key listed therein to verify if the digital signature was created in corresponding to the private key. If such verification is successful, this chain of reasoning provides assurance that the

corresponding private key is held by the subscriber named in the certificate, and that the digital signature was created by that particular subscriber.

To assure both message and identity authenticity of the certificate, the certification authority digitally signs it. This can be verified by using the public key of the certification authority listed in another certificate by another certification authority (which need not be on a higher level in a hierarchy), and that certification can in turn be authenticated by the public key listed in yet another certificate and so on, until the person relying on the digital signature is adequately assured of its genuineness. In each case, the issuing certification authority must digitally sign its own certificate during the operational period of the other certificate used to verify the certification authority's digital signature.

A digital signature, whether created by a subscriber to authenticate a message or by a certification authority to authenticate its certificate (in effect a specialized message), should be reliably time-stamped to allow the verifier to determine whether the digital signature was created during the operational period stated in the certificate, which is a condition upon the verifiability of a digital signature under these guidelines

To make a public key and its identification with a specific subscriber readily available for use in verification, the certificate may be published in a repository or made available by other means. Repositories are online databases of certificates and other information available for retrieval and use in verifying digital signatures. Retrieval can be accomplished automatically by having the verification program directly inquire the repository to obtain certificates as needed.

Once issued, a certificate may prove to be unreliable, such as in situations where the subscriber misrepresents his identity to the certification authority. In other situations, a certificate may be reliable enough when issued but come to be unreliable sometime thereafter.

If the subscriber loses control of the private key ("compromise" of the private key), the certificate becomes unreliable, and the certification authority (either with or without the subscriber's request depending on the circumstances) may suspend (temporarily invalidate) or revoke (permanently invalidate) the certificate.

Immediately upon suspending or revoking a certificate, the certification authority must publish notice of the revocation or suspension or notify persons who inquire or who are known to have received a digital signature; verifiable by reference to the unreliable certificate.

The Secure E-payment Process Method :-

Secured payment transaction system is critical to e-commerce. Without a secured payment transaction system, e-commerce will be a castle built on sand.

There are two common standards used for secure e-payments--SSL and SET. Secure Socket Layer (SSL) and Secure Electronic Transactions (SET) are two major players in the secured payment transaction market. Both use RSA public-key cryptography for encryption and authentication, but SSL and SET are very different protocols to approach payment transaction security.

SSL :-

SSL is a secured socket layer between HTTP and TCP on a Web server. It is a transport layer security protocol. SSL provides a simple encrypted connection between the client's computer and merchant's server over Internet. It also provides authentication for the merchant's server with its digital certificate from a certificate authority.

This is a secured connection for cyber shoppers 'to send payment information to e-tailor's Web-shop. It can be used as a simple order form including payment information on the Web. But it does not include the payment process protocol with Credit Card Company and issuing banks.

Currently, the fast growing Internet consumer commerce is mainly based on accepting credit card over SSL. One of the reasons for the growth in this direction is that SSL provides secured connection with encryption and authentication between two computers over the Internet: SSL provides a security handshake in which the client and server computers exchange a brief burst of messages.

In these messages, they agree upon the level of security they will use to exchange digital certificates and perform other tasks. Each computer unfailingly identifies the other. It is not a problem if the client does not have a certificate, because the client is the one who is sending sensitive information. On the other hand, the server with whom the client is doing business ought to have a valid certificate.

Otherwise, you (the " client) cannot be certain that the commerce site actually belongs to the one whom it refers to. After identification, the SSL encrypts and decrypts information flowing between the two computers. This means that information in both the HTTP request and the HTTP responses are encrypted.

Encrypted information includes the URL the client is requesting, any form containing information the user has completed (which might include a credit card number), and HTTP access authorization data such as user names and passwords. In short, all communication between SSL-enabled clients and servers is encoded. When SSL encodes everything flowing between the client and the server, an eavesdropper will receive only the unintelligible information.

Is SSL really secure? Yes, SSL indeed provides the secured connection for payment transaction between customers and merchants. It is more secure than phone and postal mail delivery. But the security ends at the merchant's site. It does not keep the credit card numbers after the transaction is completed.

SET :-

SET is a messaging protocol designed by VISA and MasterCard for securing credit card transactions over open-networks, such as the Internet.

In the SET protocol, a transaction has three players--the customer, the merchant, and the merchant's bank. SET protocol has three principal features as listed in the following:

- All sensitive information sent within the three parties are encrypted.
- All three parties are required to authenticate themselves with certificates from the SET certificate authority.
- The merchant never sees the customer's card number in plain text.

The third feature actually makes Internet commerce more secure than traditional credit card transactions, such as pay by credit card in-store, over phone, or through mail order form. It is also more secure than SSE.

To implement SET in e-commerce on Internet, it requires the SET point-of-sale client software such as SET "electronic wallet" implemented widely in the client's Web browser. It is a big challenge to make such point-of-sale software widely available to the Internet community.

Online Financial Services in India :-

Web-based banks figured their pitch was irresistible-by eliminating physical branches, tellers, and bankers' hours, they could slash costs and offer customers higher interest rates and more convenience. But in reality, customers want human contact, or at least an ATM. The multichannel strategy is what is important to people.

They want to be able to use the Web. Online banks have also learned that convenience means more than just twenty-four hour banking. In fact, some aspects of the virtual banking model are flat-out inconvenient. For example, online banks require that deposits be made by cheque or money order, eliminating the cash option available at traditional banks.

Adding physical infrastructure, though, adds to an on line bank's operating costs and may force it to lower interest rates paid on savings. Online banks maintain that they still run more efficiently than traditional banks because of practices such as online account managers, loan officers, and so on. That allows them to manage a branch with a smaller staff than a traditional bank.

Although a multichannel approach may appeal to customers, the strategy undermines the very premise of online-only institutions, and makes them less distinguishable from traditional banks that also offer Web banking services. It is a lot easier and cheaper for an existing bank to roll out Internet services than is for an Internet bank to buy enough ATMs or branches to compete on a national level.

Online banking is also known as cyber banking, home banking, virtual banking, and includes various banking activities that can be conducted from anywhere instead of at a physical bank location. Consumers can use e-banking to pay bills online or to secure a loan electronically.

Electronic banking saves a lot of time and money for users. For banks, it offers an inexpensive alternative to branch banking and a chance to enlist remote users. Many physical banks offer home banking services, and EC is used as a major competitive strategy. Online banking is growing in India.

Features of E-banking in India

1. Can access current account balances at any time.
2. Can obtain charge and credit card statements.
3. Can pay bills online.

4. Can download account transactions.

5. Can transfer money between accounts.

6. Can keep a track of accounts online.

7. Can send e-mails to the bank.

8. Customers have a flexible schedule.

9. Can also use additional services like free phone banking, ATM withdrawals, bill paying.

International banking, and the ability to handle trades in multiple currencies are critical for international trade. Although some international retail purchasing can be done with a credit card number, other transactions require international banking support. Many banks offer such services online.

Personal Finance :-

Online Often electronic banking and portfolio management are combined with personal finance. However, specialized personal finance vendors offer more diversified services, with features like:

1. Bill tracking

2. Tracking of bank accounts, expenditures, and credit cards

3. Portfolio management, including reports and capital gain (losses) computations

4. Investment tracking and monitoring of securities

5. Stock quotes

6. Personal budget organization

7. Record keeping of cash flow, and profit and loss computations

8. Tax computations and preparations

9. Retirement goals, planning, and budgeting.

Online Billing and Bill Paying :-

People prefer to pay monthly bills like telephone, utility, electricity etc., online. More so the recipients of such payments are even more eager to receive money online, as the processing costs are lower! In India, banks like ICICI and SBI make it easier with a facility of paying bills from online accounts.

ICICI provides this feature absolutely free of cost and offers customer to view the bill, status checks, and queries. For certain billers, one can see the bill online and pay immediately or schedule the payment of bills. Now there is no more hunting around for the right amount to be paid. Paying these Bills online will ensure that one does not miss any due dates. It acts as a reminder

SBI on the other hand also provides a feature called Autopay. One can set up AutoPay instructions with an upper limit to ensure that bills are paid automatically whenever they are due. The upper limit ensures that only bills within the specified limit are paid automatically, thereby providing the customer complete control over these payments.

Auxiliary Services :-

ICICI offers a few auxiliary services online as part of their online services, apart from bill payment and e-banking.

Online shopping: using the Internet banking ID and transaction password, one can visit affiliated shopping sites online and make online transactions.

Online Trading[7]: one of the most popular features of ICICI is their online trading feature. Their products and services offer the following features:

1. Trading in shares
2. Trade in derivatives
3. Investing in mutual funds
4. IPOs and bonds online
5. Personal finance and portfolio, risk management
6. Customer servicing

   Some banks like SBI also offer other features like telephone and SMS alerts.

Mutual Funds Online :-

Mutual funds online are very useful in providing financial assistance and predictions, offering services like[8]

1. Funds fact sheet
2. New launches of Public Offerings.

3. Portfolio. Trackers and Fund Monitors

These services are available online and provide useful advice on fund management and investments.

While online services are useful and easy to handle, they are definitely not risk free. There are repeated cases of fraud, carding cash, and liquidity risks, etc. which probably deter many. Again, while these are few online financial services available in India, they are definitely not exhaustive, as many we still in the pipeline and yet to hit the market, but the day is not far away!

Online Stock Trading: The High Speed Alternative :-

One can now buy and sell shares online with speeds comparable and at times better than NSE's NEAT Terminal. This speed and reliability comes only with perseverance of a pioneer backed by huge investment in technology! Intra-day price alerts that you can set, customize market. watch screen, intra-day tick-by-tick time and price data with chart, for any number of scripts. Technical experts make live calls, the news desk supplying you with the fastest information updates. Even if you load CNX 500 with 500 scripts, it will appear with all live prices in a fraction of a second.[9]

No More Paper Hassles :-

Mutilated certificates, lost certificates, postal delays, and counterfeit shares are a thing of the past. Enter a world of safe, secure and convenient buying, selling and transacting without suffering endless paperwork and delays. Convert your securities to electronic format with the demat account. It is as easy as opening a bank account.[10]

E-banking for Funds Transfer :-

Buying and selling of shares online can now be done with the help of Internet Banking". E-banking in India is guided by the Information Technology Act, 2000.

The Act provides legal recognition to electronic records, electronic contracts and digital signature. Specifically the Act says "Subject to the provisions of this section, any subscriber may authenticate an electronic record by affixing his digital signature."

Exercise :

Q.1 what is Digital Payment Requirements?

Q.2 Explain Classification of New Payment Systems.

Q.3 Explain smart card cash payment systems.

Q.4 Explain Properties of Electronic Cash (E-Cash) and how to manage electronic cheque on internet.

Q.5 How to manage risk in E-payment system

Q.6 explain how u can manage information privacy in e-payments systems.

Q.7 explain how you can manage credit risks in e-payment systems.

Q.8 Explain the characteristics of online payment system?

Q. 9 explain different online payment categories.

Q.10 what is electronic cash? Explain its properties and how it can be used in e-payment systems.

Q.11 what are the advantages of E-cash.

Q.12 explain different types of electronic money.

Q.13 Discuss about legal issues and operational risks in electronic cash.

Q.14 What are the factors for design of electronic payment system?

Q.15 What is electronic cash? Present the properties of it.

Q.16 Write about credit card based electronic payment systems.

Q.17 Write about debit card based electronic payment systems.

Q.18 Explain about digital token based electronic payment system.

Q.19 Discuss about the risks in electronic payment systems.

Q.20 Explain digital signature. How it can be used to provide security to E-payments System.

Q.21 The public is highly concerned with the safety of e-payment. What are the Specific measures put forward in the Guidance in this respect?

Q.22 What is e-payment? Why is orientation and standardization required for e-Payment businesses?

Q.23 What are the risks involved in Electronic Payment Systems?

Q.24 What are the advantages and disadvantages of a Smart Card?

Q.25 Briefly explain the various electronic payment systems.

Q.26 What are the security requirements for using online e-cash services?

Q.27 Define Digital Token Based E-payment system.

Q.28 What are the different method of Online payment.

Q.29 Illustrate the concept of Digital signature.

OR

Explain the working of digital signature

Q.30 Explain the advantages of Electronic cash.

Q.31 What does the verification require for electronic transaction on the internet?

Q.32 Explain the advantages of digital token based electronic payment system to Buyer's and sellers.

Q.33 Explain the classification of payment system in detail.

Q.34 Explain in detail public key certificates.

Q.35 explain in detail digital wallet.

Q.36 explain in detail web-based money.

UNIT 5

Customer Relationship Management

Customer Relationship Management (CRM) is defined as the aligning of business strategy with the corporate culture of the organization, along with customer information and a supporting information technology of the customer interactions that promote a mutually management is a business strategy, but it is a business strategy enabled by the advances in technology. Widespread implementation of customer information. Enterprise Resource Planning (ERP) systems, sales force automation, and integrated pint-of sale systems have made customer information readily available in large volumes. Reduced costs and higher levels of performance for database management platforms allow us to gain access to this customer information and gain new insights into our customers and their behaviour through a variety of analysis methods. Advances in contact management technology and supporting infrastructure allow us to take advantage of this information in increasingly cost-effective and creative ways. Perhaps most significantly, the Internet provides a completely new way for an enterprise to interact with its customer-the electronic channel, or the e-channel. With consumers buying everything-from groceries to automobiles-on the Internet and the businesses beginning of customer interaction are constantly changing. In the business environment, the focus is being shifted to customer retention.

The link between customer satisfaction and the return on investment is the profit for a company, as shown in Figure 5.1
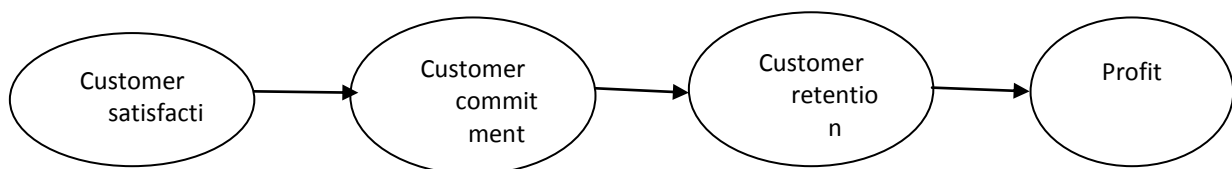
Fig.5.1 Customer satisfaction and profit

Customer Relationship Management

Beyond the glamour of developing the e-channel, business is investing heavily to deploy customer relationship management in traditional channels. In most cases, these capabilities are developed independently, requiring expensive integration later on to achieve the vision of true customer relationship management on an enterprise-wide scale. Integration of these resources is one of the key challenges of successful deployment of CRM across the enterprise- wide scale. Integrations of these resources is one of the key challenges of successful deployment of CRM across the enterprise. This is because it has a direct impact on the consistency of the customer experience with the enterprise. So how does the enterprise integrate systems across functions and channels? It does not happen by accident, but through provision and planning. All the functions and the channels must come together to develop an enterprise-wide strategy for CRM. Only then can the enabling information technology be fully integrated with maximum efficiency and effectiveness. This technology spreads customer information throughout the enterprise and it must be based. On unified information architecture.

Independently developed CRM capabilities within the various parts of the enterprise usually begin based on function-specific short-term needs. Marketing begins to implement CRM with a variety of products offer combined with integrated suites to plan, execute, and monitor marketing campaigns and perform database marketing. Lead management and sales force automation capabilities are deployed to support the field sales force. Systems that mange the supply chain and product delivery are deployed to support mass customization and to provide up-to-the minute information about the goods in transit, to the customer. Field service representatives and contact centres deploy sophisticated telephony and information systems to provide ongoing customer service and cross-selling.

These separate capabilities do provide a means to support function-specific and channel-specific CRM strategies. Business culture can shift from product-focus to customer-focus. Sales and marketing can focus on retention and increase of share of customers instead of and up-sell opportunities. However, customer information does not freely flow across the enterprise. To obtain the vision of customer relationship management, information must move about freely. This requires integrations.

Only through the integration of marketing, sales, fulfilment and service across business partnerships, the direct sales force, the telechannel and the e-channel. Is the vision of customer relationship management realized? Customer information must flow like water within, around and through these functions and channels to ensure that the enterprises can build mutually beneficial relationship with the customers, and even amongst their customers. Everyone in the enterprise participating in the conversation with the customer needs access to the latest information on the customer's profile, behaviour, and expressed needs. Marketing provides the latest promotions and offers for individual customers, based on their interactions on the website, Products are customized to meet specific customer needs and customer service is fully done, resulting in increased levels of customer satisfaction and duty. With an enterprise- wide view of each customer, the value of each relationship is measurable, and each relationship is managed based on this value. Every customer touch becomes an opportunity disposal of the enterprise. Achieving this vision results in unprecedented competitive advantage in some industries Or mere survival in other industries.
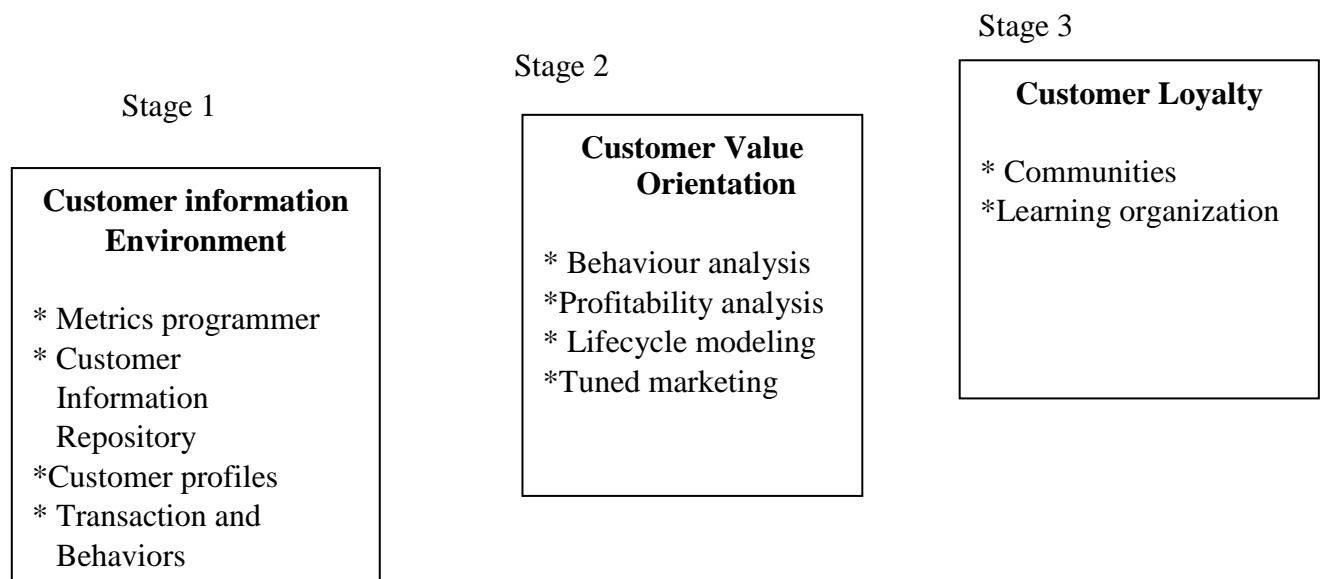
E-CRM Solutions

E-Customer Relationship Management or E-CRM solutions are especially valuable to companies that face the following circumstances:
1. Business is driven by mission-critical customer service requirements
2. Current costs for CRM run high
3. Large volumes of information is distributed
4. A complete customer care solution is needed.

      E-CRM solutions can be deployed and managed to provide increased revenues and decreased costs for companies while improving customer service. E-CRM goals can be achieved with Internet business strategies, web-based CRM specification development, web systems design and project management, interactive interface design and electronic publishing.

      The strategy for E-CRM can be visualized in three stages, as given in Figure 5.2

Stage 3

Stage 2

Stage 1

| **Customer information Environment**

* Metrics programmer
* Customer Information Repository
*Customer profiles
* Transaction and Behaviors | **Customer Value Orientation**

* Behaviour analysis
*Profitability analysis
* Lifecycle modeling
*Tuned marketing | **Customer Loyalty**

* Communities
*Learning organization |

Fig. 5.2 Strategies of a Customer focused business.

Customer Information Environment

In the first stage, building up of a customer information environment and acting on it forms the starting point. It consists of Metrics programmers, Customer information repository, and monitoring customer behaviours.

Customer Value Orientation

In the second stage, operational effectiveness is the focus. Customers want value for their money. They believe that they have got value, when the perceived benefits they receive from something exceed the costs of owning it. These components are represented in Figure 5.3

Customer Loyalty

In the third stage, the focus is on the integration of internal process of the organization with the customer in creating a community.
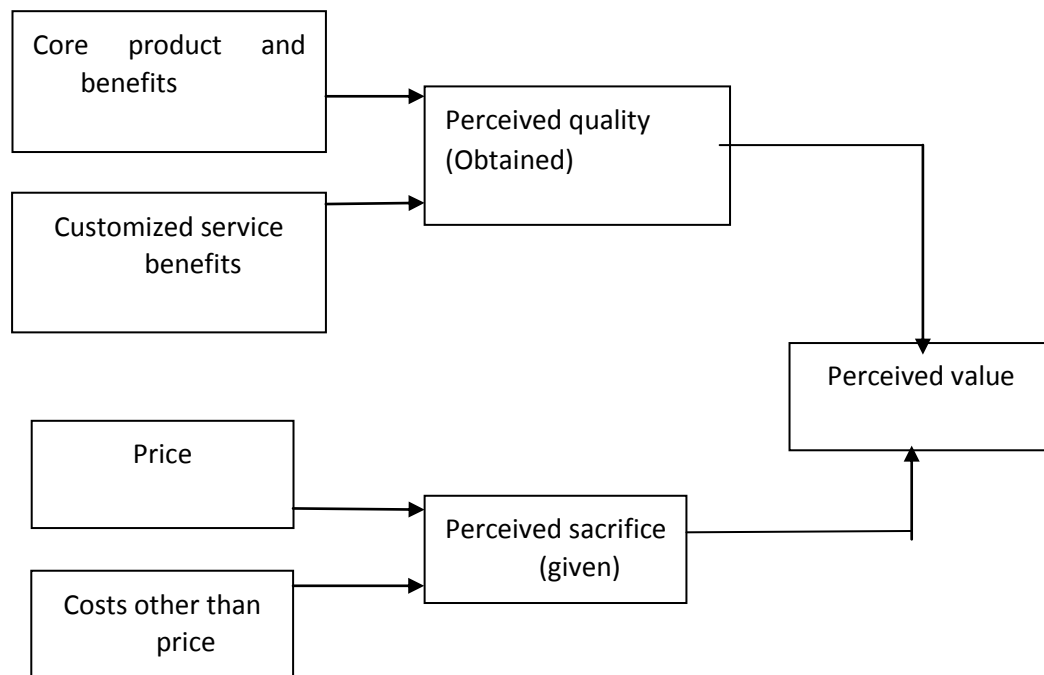
Figure 5.3 Perceived value.

Moving costly customer services to the Internet is critical to staying competitive. Providing customer services to the Internet means a lot more than just having a website. With users demanding more services via the Internet, leading companies have realized the importance of their e-services strategies on the Web.

Most companies are focused on today's most critical business challenge- attracting and retaining customers. These companies require customer- directed e-business solutions and E-CRM to meet those requirements. Companies benefit from huge cost savings and increased wealth Customers benefit from on-demand access to information, less hassles with better support, and less expensive services.

The strategy of the portals is to become global supermarkets providing everything for individuals, families and organizations. Their customer base is what stock market considers being the most important asset of these companies. Table 5.1 summarizes the customer relationship valuations as seen in the table; each customer is worth $4000 for Amazon. So increasing the number of customer, in itself is an aim of the portal.

TABLE 5.1

VALUATION OF COMPANIES BASED ON CUSTOMER BASE

Company name	Electronic customer relationships (In million)	Market Capitalization (In million)	Value of each relationship ($)
AOL	50	$ 100	2000
Yahoo!	40	$ 40	1000
Amazon	13	$ 26	4000
eBay	5	$ 20	4000

When Humans Are Not Enough- Or when There Are Not Enough Of Them

For many e-customers, the Web is like an infinitely large shopping mall they have all to themselves. Although the absence of long lines at the checkout counter and the freedom form the difficulty of parking are welcome, the lack of other shoppers and even salespeople can make them feel lonely. For a Social shopper- a woman who enjoys shopping with friends- looking for a product on the Web can be similar to going a movie all alone. Then fun factor is missing, regardless of how great the move is. On the other hand, if she's mission shopper- she enters, extracts the goods, and then makes her exit as soon as possible-than shopping on a highly structured website can be a welcome respite from the time-consuming task of searching the malls. In either case, even a potentially annoying salesperson can be a welcome sight when the woman simply cannot find the product she is looking for.

These two aspects highlight several important elements in human customer service interactions. The most obvious is variability. What constitutes a good customer service in one and individual levels. For example, an individual may have different expectations of what constitutes a good customer service in the airline, hotel, and restaurant industries. He probably has specific expectations about his favourite airline or hotel chain. Furthermore, he no doubt expects different levels of service at each location.

Variability in service can result from a variety of factors. Perhaps the staffs in one location has insufficient training to understand their customer's needs. May be, they just do for three months in the marketplace, making it virtually impossible for a salesperson to become an expert on a particular product before another replaces it. Clearly, with some products and services, it is simply absurd to expect a salesperson without extensive training to become proficient in interfacing with customers in more than a superficially way.

If someone were to ask the person who manages the customer service division of a business to name his greatest assets and liabilities, he will say it is the people, it is a challenge to attract people and keep them attentive and educate them, but it is usually worth the effort. Good customer service representatives can provide personal, empathetic, quality, reassuring service, especially when they interact with the customer in person. Nothing beats an attentive, knowledgeable sales or support person in terms of bonding customers to a company. Great sales and service representatives create a loyal following that is often independent of the company they represent.

Although there are situations when only a live customer service representative is required, this is not always possible. With today's busy lifestyle, there is simply not enough time to have face-to-face interaction. Increasingly, sales and support interactions occur with the assistance of communications and computer technology, even for costly items. For Example, when time is a scarce resource and a unstructured conversation can resolve things in a few seconds, telephone is of great help, especially since it is universally available.

Against these advantages of personal service sales and service representatives are expensive from a practical perspective, especially in a 24 hours, 7 days support model. In addition, there is the aforementioned variability in service, due to dozens of possible issues, such as a representative's disinterest in a particular product because there are dozens of other products he needs to know about. One of the major limitations of human customer service representatives is that they normally work with customers on a one-on-one basis. Scalability, the ability to work with multiple customers at once, is possible in group presentation situations, but then the personal, one-on-one interaction. Suffers. There are also errors, of both omission and commission, which can appear in any human-mediated transaction, regardless of the touch point. This is especially true when the transaction involves the manual entry of data.

As the effective interaction distance between customer and support staff increases from personal to phone, to live Web chat, to e-mail interactions, many of the positive qualities of personal interaction normally ascribed to a good customer service representative decrease. The potential for using the touch point in an emotionally intelligent interface diminishes as well. For example, it is much easier to foster an emotional bond with a customer through personal interaction than through e-mail. In addition, human-mediated interactions tend to Often; this is simply because someone has to take time to record the data. Furthermore, it may be impossible for some employees to fulfill their data- logging requirements because they may lack the education needed to understand the product or service. For example, a new employee may not be able to understand the product or service. For example, a new employee may not be able to differentiate between fabric types, sari styles, or designer labels. Another characteristic of human customer representatives is that they bring with them a variety of security and confidentiality issues, from both an employee and a technology perspective. That is the equipment the support staff uses must be protected from viruses and break-ins, and employees must be trusted or guarded as well.

How Technology Can Help

Interactive computer and communications technology can assist in the sales and support process in several ways. Telephone, live chat and e-mail can enhance the effectiveness of customer service representatives. Computer- mediated e-mail, chat and animated chat can

take over when a human representative is exhausted. They can serve as a filter, answering all but the most difficult questions for the representatives.

Web technology can also help offload the support issue to customers who enjoy helping each other on the Web. For example, Lands' End adds to the fun of shopping with its shop with Friend^{TM} option. Two shoppers can browse together and add items to the same shopping cart. For example, two friends working in different companies can go shopping during their lunch break, just as though they had met and gone shopping in the same brick-and mortar retail outlet. There is no busy date warehousing or cluster analysis involved, just a two-way Web chat connection and a slight modification in their shopping cart model. The customers take care of navigating the Web and helping each other with product selection.

In a similar vein, several vendors, including Cahoots, Hyper nix, ICQ, My ESP com, and Third Voice, and Web Side Story, offer live-chat technology to make online shopping less sterile and more emotionally engaging. Their idea is to create a sense of Community for a particular website by allowing prospective customers to communicate with each other at any time, even without knowing each other's name.

For example, customers shopping for widgets on a particular website could ask if other customers had a good or bad experience with widgets purchased there, anyone visiting that website could respond to the query and discuss the merits and demerits of those widgets. The goal is to improve upon the Web's record of two-thirds cart abandonment. That is about two- thirds of all shopping carts are abandoned at some point before final checkout. From the perspective of a website owner and the one paying for the live-chat capabilities, the danger is that the discussions may become critical and out of control.

Human-mediated personal contact, phone contact, live web chant, e-mail, and animated Web chat are representatives of the range of possibilities currently available, where animated Web chat represents the greatest level of technological involvement. There are also several technologies on the horizons, such as two-way Web-based video links, but the realities of current bandwidth limitations of the Internet are holding these technologies at bay. Also, the value for each characteristic attributed to a touch point represents a typical case. As with any measurement or estimate, there is variability in the actual value shown.

Reducing Cost Per Contact:-

One of the effects of adding the appropriate technology to the customer support or sales mix is that there is often a reduction in the cost per contact, i.e. the money spent to connect with each customer. The cost per contact tends to be highest for personal. One-on-one interactions, simply because the representative's full attention is necessarily focused on a single customer. The customer receives the full benefit of the representative's training during the period of contact, as well as many of the resources that result in direct and indirect costs to the company.

With the addition of phone technology, the support representative is freed somewhat from dealing with one customer to the exclusion of all others. For example, he might be on potential customer or client, filing papers, cleaning up his desk, or in some way contributing to his own and the company's future success.

Similarly, live, Web-based that and e-mail have a relatively low cost per contact, in part because the support representative can multitask. For example, in the case of a live chat,

the representative can communicate with potential customers on the Web in spurts, and in between sessions, handle other support issues. Furthermore, since e-mail is normally handled in batches, often with canned responses, a customer service representative has time between email runs to perform other functions.

Moving from primarily human to computer- mediated interactions, the cost per contact is potentially even lower. Computer-mediated e-mail is generated by a bot, can respond to hundreds of e-mails during the time it takes a human to answer one or two. Similarly, computer- mediated chat, where real-time chat bots help customers, can reply to hundreds of queries per second. The same rationale holds for animated chat bots that incorporate emotive animated graphic characters. The marginal cost of handling an additional customer is an insignificant increase in the server power and Internet bandwidth requirements.

Decreasing Development Time

Customer representatives are expensive to train, to keep motivated, and to retain, especially in this state of the economy. Training a representative for a new product or service may take a few days or up to several weeks, depending on the complexity and the number of products and services the representative is expected to sell or support. Development time is the greatest for representatives who work face-to-face and representatives with fascinating manners, speech, dress, and charisma are hard to find. A business may be lucky enough to locate a representative who has excellent live chat skills, but whose squeaky voice may not do in phone support and whose green hair might not present the image the business is looking for in person-to person sales.

Characteristics of human versus computer-mediated customer service representatives very over a variety of touch points. This is illustrated in Table 5.2 As you can find; variability in service is the greatest with personal, one-on-one contact and telephone service.

With computer-enabled tools, such as liberty of canned phrases, customer service representatives can be trained to become proficient users of live chat and e-mail even if they are slow typists. As long as the representative can recognize which phrases or responses to use in specific circumstances, even minimal keyboard skills will do. E-mail is one of the most forgiving touch points, since the dialogue does not occur in real time. A customer service representative has time to refer an unintelligible e-mail to a supervisor who can then answer it or route it to the appropriate person to handle.

In comparison to training human customer representatives, computer- mediated e-mail and chat have moderate development times. The likely questions and the corresponding answers have to be gathered and compiled into a knowledge base. The normal software development cycle of testing, modifying, and again testing and re-modifying the code and the knowledge base until everything checks out can take weeks, even with a simple support problem.

TABLE 5.2

COMPARISON BETWEEN HUMAN AND COMPUTER INTERACTION[2]

Characteristic	Human				Computer		
	Personal	Phone	Live chat	E-mail	E-mail	Chat	Anim chat
Cost per contact	O	Δ	*	*	*	*	*
Development time	O	Δ	*	*	Δ	Δ	O
Emotional bond	O	Δ	Δ	*	*	Δ	Δ
Emotive	O	Δ	Δ	*	*	Δ	Δ
Empathetic	O	Δ	Δ	*	*	*	Δ
Error prone	O	O	O	O	*	*	*
Flexibility	O	O	O	O	Δ	Δ	Δ
Interactivity	O	O	Δ	*	*	Δ	O
Continuity	*	*	Δ	Δ	Δ	Δ	Δ
Personal	O	O	O	O	O	O	O
Personality	O	Δ	Δ	*	*	Δ	Δ
Quality	O	Δ	Δ	Δ	O	O	O
Reassuring	O	O	Δ	*	*	Δ	Δ
Reliability	Δ	Δ	Δ	Δ	O	O	O
Responsive	Δ	Δ	Δ	*	Δ	O	O
ROI	*	Δ	Δ	Δ	O	O	O
Scalability	*	*	*	Δ	O	O	O
Transference	O	O	*	*	*	*	Δ
Variability	O	O	Δ	Δ	*	*	*

O High∆ Medium* Low

Creating Emotional Bonds

Although the golden standard for creating an emotional bond between the customer and a company is to have dedicated. Charismatic salesperson or a representative, technology can be of great help in creating an emotional bond. As illustrated in Table 5.2, personal contact is capable of creating the most profound emotional bond. Live chat is also capable of supporting a meaningful dialogue that can help create an emotional bond, but it is not as powerful as the phone or direct contact. Since e-mail lacks most of the cues we normally associate with a conversation, such as immediacy, it has the lowest likelihood of creating a meaningful emotional bond.

Computer-mediated chat and animated chat, when appropriately implemented, have the best chances of creating an emotional bond with the customer.

Presenting Emotive

Human beings are emotional creatures. We react to not only language and voice intonation and the subject, but also to dozens of subtle cues, in the form of physical gestures. For this reason, it can be stated that personal interactions convey the most emotive content. E-mail has the lowest emotive content capacity, in part because of the time factor. Both chat and e-mail can enhance the messages with the use of emotive icons or emotions. Of the computer-mediated options available, animated chat has the greatest potential for conveying emotive message to a customer.

Displaying Empathy

Great salespeople and customer representatives are sensitive; they can understand the customer's situation or at least give the impression that they do. It is the impression that matters to customers; they want to feel that they have been listened to. This felling can be communicated best in person, but to some degree over a phone conversation and to a lesser extent over a live chat conversation. Because it lacks immediacy, e-mail tends to be a poor communications conduit for sensitive thoughts and feelings. Computer-mediated communication, such as e-mail and live chat, do not very well when the goal is to communicate feelings that may be difficult for a computer to convey. In this regard, animated chat communications can sometimes convey a sense of understanding, when used as the touch point.

Reducing Human Error

Humans are simply more error-prone than computers when it comes to manipulating symbols and values. Assuming there is an accurate customer data to work with; computer-mediated customer communications can have a much lower error rate than human-

mediated communications in tracking orders, verifying charges, and identifying repeat customers.

Increasing Flexibility

While computers might excel in flawlessly following human instructions, good customer service representatives excel in flexibility. Regardless of the touch-point, a good representative, when properly trained, can help rectify errors or retrieve missing data that current computer-mediated systems cannot.

Improving Interactivity

Interactivity, the ability of representatives to respond to customer's queries in near real-time, is best in person and over the phone. E-mail interactivity suffers from an inherent lag from the time a problem statement is made to the response, but the lag time tends to be smaller when the e-mail is computer-mediated. Chat, whether live or computer-mediated, can support a moderate level of interactivity.

Increasing Continuity

From the customer's perspective, continuity can be extended with computer-mediated chat and e-mail. Continuity is important in forming a bond with customers, especially with personal, and to lesser extent, phone interactions. Computer- mediated communications can provide infinite continuity. For example, the names used to identify a chat bot can be held constant, and the appearance of animated figures used in animated chat communications can remain constant as well.

Adding a Personal Touch

Even human-mediated communications tend to rely on computer-generated or warehoused customer data to the same extent that computer-mediated communications do. In other words, most touch-points are already leveraging computer technology to provide a personal touch.

Communicating Personality touch.

Communicating Personality

Computer hardware, programs and websites, all have personalities, However, just as personal interactions tend to have a great potential to exhibit personality, animated chat, where an anthropomorphic figure can communicate with visual cues, text and even voice, has a much greater chance of communicating personalities to customers. The challenge is to create personalities that customers can relate to in a positive way.

Increasing Quality

The quality of customer dialogue tends to be highest when it is controlled by a good salesperson or motivated customer service representative. Phone, live chat, e-mail, and other touch-points can also be of high quality, but are usually not as high as of a good salesperson. Computer technology can help with these other touch-points by minimizing variability and otherwise contributing to quality control. Computer-mediated communications can have consistent, high-quality dialogues with customers, because all possible responses can be validated before they are presented to customers.

Providing Reassurance

An important aspect of the sales process is reassuring customers that their purchase decisions are correct, their problems have been solved, and that their products are on the way. Computer technology can be used for something as ordinary as helping reassure customers about the status of their order, or as sophisticated as creating a personal profile of customers and using it to explain why the products they just ordered are in their best interest.

Increasing Reliability

Humans vary in their reliability from person to person and from day to day. Computers are reliable machines as long as human-generated viruses to not attack them. A business can

rely on computer mediated communications with customers as long as it has tightly controlled parameters. In short, computers excel where reliability is an issue.

Improving Responsiveness

Properly trained sales and support staff can do a good job of responding to customer needs in a timely manner. E-mail has the lowest responsiveness of the human-mediated communication, simply because of the inherent delays in e-mail communications. By definition, e-mail carries with it, a perceptible delay that is not noticed or at least is not significant in a live chat, for example. Because of the rapid 24 X 7 response made possible by computers, computer-mediated chat and animated chat are potentially much more responsive that a customer representative or salesperson could be.

Improving Return on Investment (ROI)

Generalizing the Return on Investment (ROI) for a customer representative or computer technology is complicated. There are always specific circumstances, such as the cost of money and the specifications of the people or computer technology involved. However, in today's economy, it is generally understood that the turnover is high. This is especially true in the customer-support area, where temporary and seasonal workers fill a relatively large number of representative jobs. It is because of the variable nature of the labour supply and the low cost per contact for computer- mediated dialogue, that the ROI for computer-mediated support of all types is potentially greater than for human-mediated support.

Increasing Scalability

In general, humans do not scale very well. Most interactions are on a one-on-one basis, such as personal, phone. And live-chat communications. E-mail is scalable because it may be handled in batchers, with same generic answer being applied to hundreds of questions. In contrast, computer-mediated touch points are virtually infinitely scalable, given an adequate infrastructure, including supporting server hardware.

Controlling Transference

Transference is, ascribing the characteristics of one person to another, often at a subconscious level. This may be the result of similarities in appearance, style of speech, or mannerisms and can be a positive or a negative factor in the sales and customer- relations process. For example, a salesman may subconsciously remind a woman of a trusted relative, and she will instinctively believe everything he says. Conversely, the same salesman could remind her of an unscrupulous sales person she dealt with in the past, and the develops the same negative attitude towards this one. In human-mediated communications, transference occurs primarily with personal contact, but may also occur in phone conversations.

Transference can be an asset in computer-mediated interactions. For example, a business can provide customers with the ability to modify the animation and synthesized speech to suit their preferences. It could present customers with a menu of animated figures including male, female, young and old, from which they could choose. In addition, it could allow customers to specify the speaking style of each figure, from businesslike to casual. Customers do not generally create figures to learn from or deal with what they do not relate to positively.

Decreasing Variability

Variability is a characteristic of human-mediated communications that is virtually absent in properly designed computer-mediated dialogues. This variability may be a nuisance, as for example, if the customer inquires about tax code information. An animated chat bot may not be as engaging as a human, but a business will know, to what information its customers are being exposed.

Where Interactive Web Technology Shines

From the above discussion, it is apparent that of the characteristics listed in Table 5.2 web-based customer support has the following advantages.

1. Lower cost per contact
2. An emotional bond with the customer

3. An ability to communicate with more emotive content

4. Fewer errors

5. Greater customer interactivity with a website

6. Improved reliability

7. Greater responsiveness

8. Greater return on investment

9. Improved scalability

10. Less variability in the quality and content of communications.

What really matters is how businesses apply these potential benefits of interactive technology to their Web presence. If the goal is to create an Emotionally Intelligent Interface, then a business could use these technologies towards setting the tone of interaction, involving

Its customers in a mutually beneficial dialogue, and using interactivity to establish a meaningful relationship

When potential customers visit a website, they should be made to feel comfortable with the company and confident that it can fill their needs efficiently and economically. At a brick- and –mortar store, the sales staff and the layout and decoration of the reception area of the store perform this function. The environment established by the technologies incorporated in the website can dictate customer's responses to the business, and how long their visit to the website lasts. Creating a welcoming environment can entail something as simple as creating a panel of potential customer service representatives and allowing customers to choose which one they would like to interact with, whether the representatives are real or virtual.

E-CRM Toolkit

An E-CRM 'toolkit' covers a wide diversity of channels (see Figure 5.4) In order to bring true customer management across online business; one needs the E-CRM Products to fulfill the following criteria:
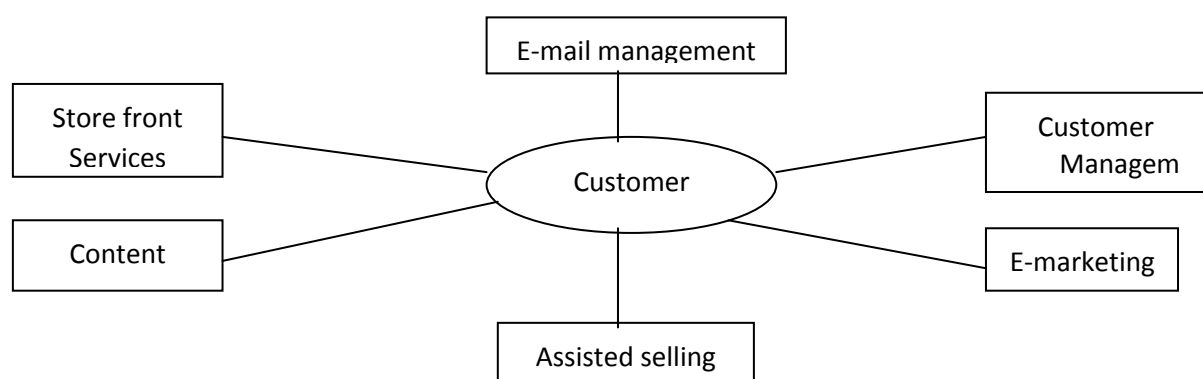
Fig 5.4 E-CRM Toolkit

Content

Is the system delivering the contents a customer wants to see? How is being managed on the IT Platform?

Storefront and Merchandising Services

With large numbers of visitors failing to complete transaction at the checkout, it is needed to ensure that your storefront services propel your customers to the cash point.

E-mail Management

Are e-mail campaigns focused to provide an offer that customer cannot refuse? How are these tied in with websites so that customers enjoy a seamless experience?

Customer Management

Is the company managing date across all the sales and marketing functions to its best?

E-marketing

How well are e-marketing efforts targeted? How well do they combine with online selling operation?

Assisted Selling

One needs only to look at the Dell business model to see how assisted selling can enhance the shopping experience and achieve business success. But what assisted selling approach will work best for any company?

Typical Business Touch-points

Typical business touch-points from a consumer perspective include: Media-TV, Radio, Newspaper and flyers; Physical- the physical plant, such as a showroom or retail outlet; Personal-direct people contact, including salespeople and customer representatives; Mail-correspondence, bills, and payments through postal service; Phone-telephone communications with sales, marketing, and customer service representatives; E-mail-Communications via computer regarding orders and services; and web-information and ordering through the Web.
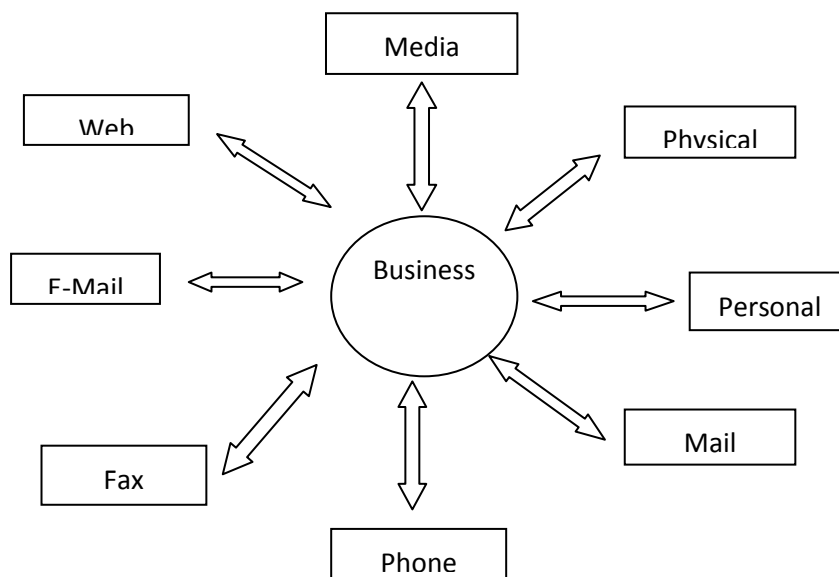
Fig 5.5 Touch-points for normal CRM.

Figure 5.5 illustrates the state where every touch-point is significant. The arrows therein indicate the relative significance of each touch-point. For any company, it simply is not enough to know "who buys what?" order to build a successful, profitable marketing campaign. It needs to know who its customers are, and how much it should invest on them. This necessitates the maintenance of a consolidated database. The Components of the data warehouse can be found in Figure 5.6
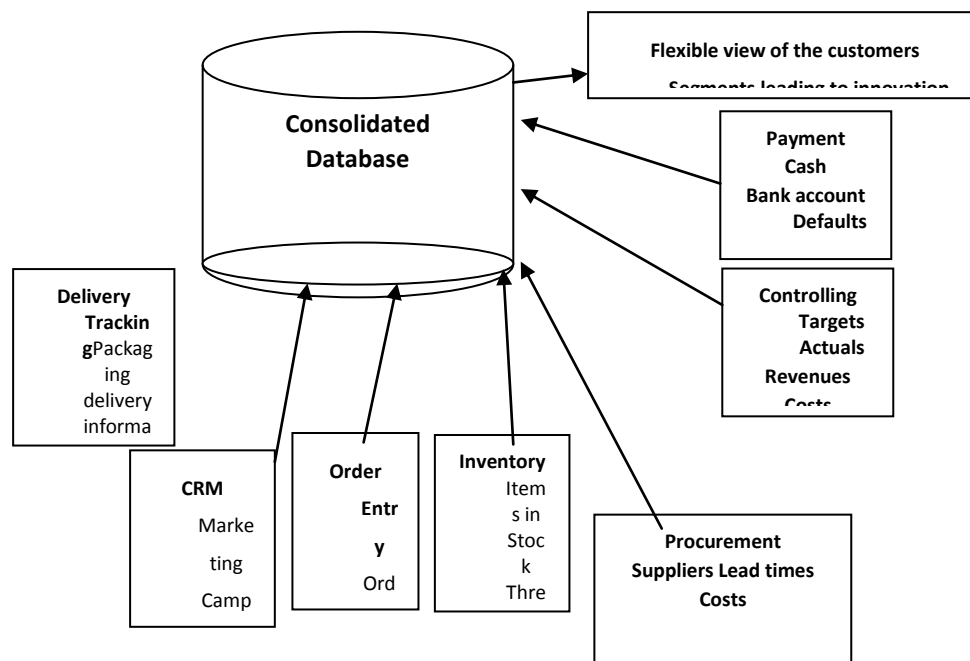
Fig. 5.6 *Data warehouse architecture.*

Converting clicks to customers

To leverage technology and thereby realize the greatest benefit from a web presence, a business must first know what it is after, in terms of relationship with its customers. Assuming that the goal is to provide a website with an Emotionally Intelligent Interface, management also has to appreciate the possibilities within the business resource and technology constraints. Note that the technologies with the greatest degree of interactivity provide the greatest potential for a sale. A business needs to pull everything together in a way that harmonizes with its customers; the business should use the technology at its disposal so that the odds of creating a loyal customer following are maximized.

Managing Customer Value Orientation and Life Cycle

The CRM industry has matured rapidly over the past few years. Contact managers have evolved into full-function sales force automation systems. CRM front-office suites now support marketing, sales and service. Integration between CRM systems and enterprise resource planning (ERP) systems is becoming more common. If not commonplace.

The E-CRM market is new and rapidly evolving. Implementing CRM for traditional front-office marketing. A sales and service operation is becoming the top priority for most companies. That prospect has been challenging enough, being formidable to the new

touch-point such as the Web. Integration is still the key. Online or offline, client/server technology is still a major factor. Anyone who has implemented client/server applications between the various contact centres and touch points within an enterprise can afford the complexity and the cost involved in them. In short, CRM is a square peg and e-business is a round hole. However, everything is changing with the introduction of new, Web-based CRM solutions.

To help organize the chaos, E-CRM solutions can be grouped into two categories Web-based solutions and Web-extended solutions.

The Web-based CRM solutions are designed from the bottom up, exclusively for the Internet. These are very innovative products, initially focused on the sales (e-commerce) function, more marketing and service capabilities will be soon added.

Web-extended CRM solutions are established (primarily client/server-based) CRM suites, originally designed for enterprise users with extensions, to include web-interface functions. There are three phases of CRM:

1. Acquisition
2. Enhancement
3. Retention

>   Each has a different impact on the customer relationship, and each cans <mark>more olooelytie</mark> a company with its customer's life.

Acquisition

You acquire new customers by promoting product/service leadership that pushes performance boundaries with respect to convenience and innovation. The value proposition to the customer is the offer of a superior product backed by excellent service.

Enhancement

You enhance the relationship by encouraging excellence in cross-selling. This deepens the relationship. The value proposition to the customer is an advantage with greater convenience at low cost (one-stop shopping).

Retention

Retaining profitable customers for life should be the aim. Retention focuses on service adaptability, i.e. it delivers not what the market wants, but what the customers want. The value proposition to the customer enhances a proactive relationship that works well with the best interest of the customers. Today, leading companies focus on retention of existing customers much more than on attracting new customers. The reason behind this strategy is simple: If you want to make money hold on to your good customers. But do not be fooled: it is not as easy as it seems.

All the phases of CRM are interrelated as shown in Figure 5.7 However, performing the tasks well in all the three phases is a difficult proposition even for the best of companies. Companies often have to choose which one on these dimensions will be their primary focus.
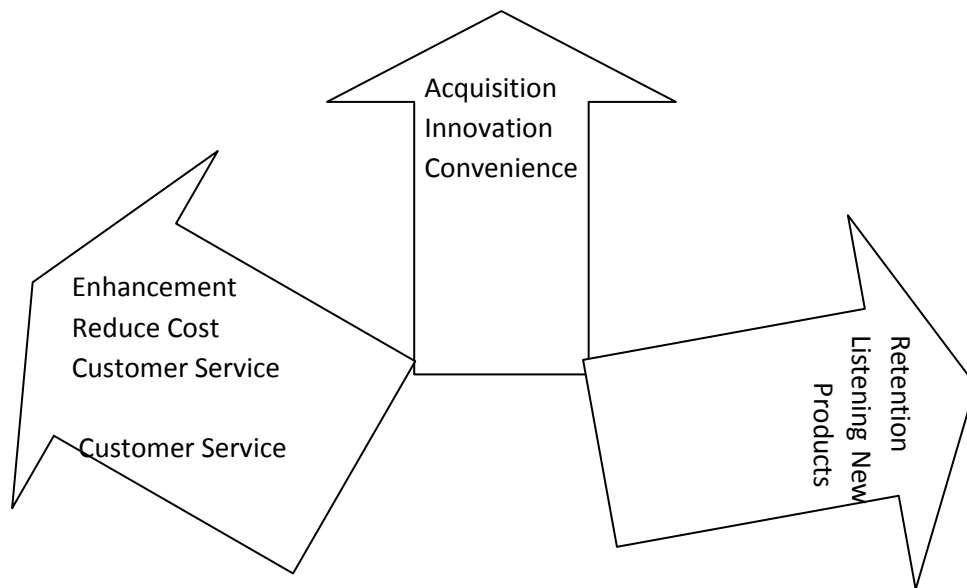
Fig 5.7 The three phases of CRM[3]

The Customer Retention Goal

Attracting and retaining customers has rapidly emerged to be the most mission-critical function of leading businesses. Everything (Products, services, pricing, and the like) is a commodity. Customer retention has replaced cost-effectiveness and cost- competitiveness as the greatest concern of business executives today. It costs five to ten times more to get new customers than to retain the existing ones. It is going to involve more efforts than web interactions to keep the customer brand-loyal.

The Power Shift

Give customers what they want. This can be a challenge, or it can be an opportunity. The same technology that has made it more difficult can also make it easier. Customers are more important than business people. Companies need to do business with customers in their own way. The key is integration of the various points of customer contact, including Web, contact centres, wireless (field) and others. All customer interactions must be consistent, with clear value delivered to the customer and the company.

E-CRM is not the single answer to attracting and retaining customers, nor is e-customers the only valuable customers. Indeed, Internet is not the only point of contact with the customers, nor is the other digital.

Customers should not be segmented, based on the assumption that they will predominantly choose one point of contact with business. More likely, customers will have multiple points of contact, including our website, contact centre, sales and field service representatives. They expect a consistent experience from point to point. They expect the company to be easy to do business with.

Very soon, the "e" fancy will subside. Executives in every industry will recognize that the next major phase of the Web phenomenon is actually integration with other points of contact. Blended media is the true killer solution for business.

In the past, if marketers wanted to incorporate technology into their environment, they often looked outside the enterprise for help. Sales frequently outsourced lead management separated from each other and the enterprise. There were a number of reasons for this, such as the following:

1. Their internal IT department did not understand what was needed.
2. The IT department had other priorities and would take too long to develop the needed technology.
3. The functional areas did not trust their own internal data, believing it to be of too poor a quality to be useful.
4. The business people did not understand the technology, and so could not explain what was needed, technologically, to their IT personnel.

To support the transition of the enterprise from a customer focused approach to doing business, individuals throughout the enterprise must have access to a set of capabilities necessary to plan and manage customer interactions or customer touches. These capabilities can be categorized in two ways.

1. Operational, Tactical, or Strategic capabilities to the enterprise.
2. Acquisition, Retention, and Expansion of a Customer Relationship

These two categories represent the business perspective of the capabilities and how they relate to the customer. However, it is probably more useful to look at capabilities from the customer's perspective. After all, the purpose of these capabilities is to gather customer information and use this information to modify customer behaviour in a mutually beneficial way. To look at these capabilities from the perspective of the customer, it is necessary to way. To look at these capabilities from the perspective of the customer, it is necessary to realize how the customer interacts with the enterprise over time, as the enterprise:

1. Acquires the initial customer relationship
2. Works to earn the customer's persisting loyalty; and
3. Expands the relationship to gain a greater share of each customers purchasing potential.

These activities represent a cyclic process of interactions between each customer and the enterprise, represented as the Customer Life Cycle (CLC). Using CLC as a tool, we can see how CRM capabilities affect customer interactions at various points in the life cycle. Figure 5.8 explains the concept.

CRM Capabilities and the Customer Life Cycle

Customer acquisition consists of the business processes in the CLC leading up to the customer moment, when consumers become customers... Or not. This includes awareness generation knowledge transfer, consideration, pre-sales, and evaluation. Capabilities include consumer surveys in business operations, tracking enterprise-wide customer interactions in business management, and market basket analysis in business intelligence.

Global Marketplace
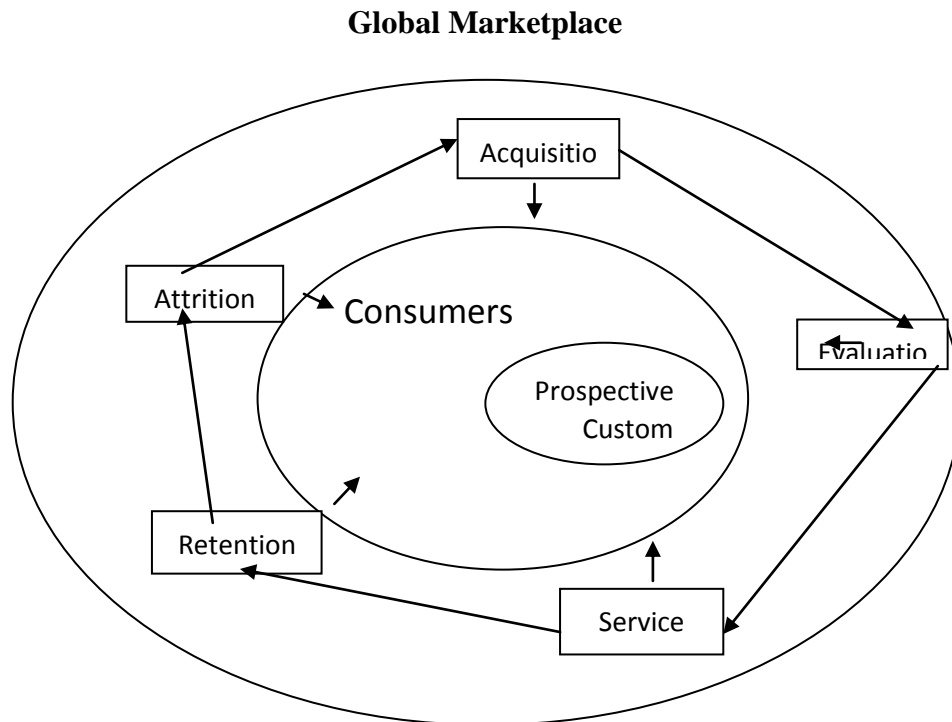
Fig. 5.8 Customer life cycle.

CRM Capabilities and the Customer Life Cycle

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Expanding the "share of customer" is gaining the largest portion of acquisitions made by each individual customer in the global marketplace. The proportion of a customer's money that goes to a particular enterprise is known as the share of customer. Example capabilities include delivery of new information to customer through business operations management capabilities, and identifying cross-sell opportunities through business intelligence additional sales without the cost of acquiring a new customer. However, expanding the share of customer is as valuable as customer retention. Most companies find that their most profitable customers are the ones that spend the largest percentages of their budgets with the enterprise. For example, one bank recently indentified that every one of their most profitable customers (the top 20 per cent) gave their business to the bank. What is new is the customer-cantered nature of applications, which means organizing CRM processes around the customer rather than marketing, sales, or any other internal function. Measurements and feedback from the customer enable improvements in the CRM process. The customer's viewpoint becomes an integral part of the process, allowing it to change with the customer's needs. In other words,

companies base their actions not on the priorities of functional fiefdoms, but on the overall corporate objective of providing customer satisfactions.

However, before aggressively deploying CRM applications (see Figure 5.09), managers might have to restructure customer-interaction processes. Functional and organizational structures tend to compartmentalize the various activities that go into serving the customer. Such fragmentation prevents customer information from being dispersed far enough within the organization to be useful; in fact, it often stands in the way of efforts to build a relationship. As a result, customized service is difficult and consequently. Organizations tend to treat all customers the same – a damning impediment to building closer relationships.

To counter fragmentation, leading-edge companies strive to take a more customer centered approach to CRM. There is a growing trend towards managing all the activities that identify, attract, and retain customers in an integrated fashion that is, managing them as a CRM processes, organizations can create end-to-end communications and performance accountability for entire sets of activities. In short, a CRM infrastructure is really a portfolio of process competencies.
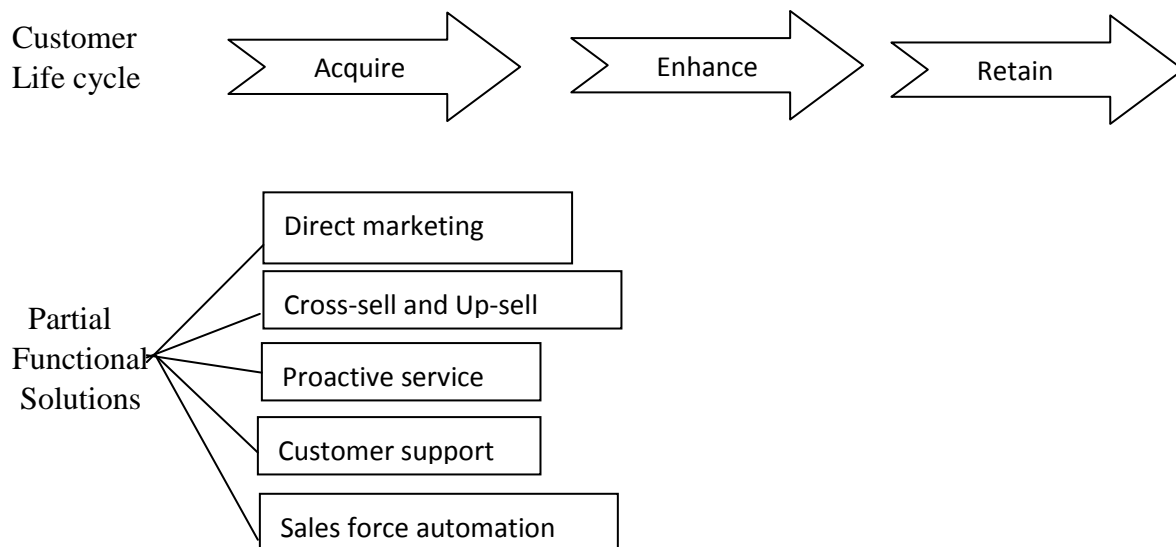
Fig. 5.09Integrated CRM applications.

CRM capabilities supported by business operations Include:

- Consumer surveys and focus groups
- Delivering information to consumers
- Tracking promotional materials
- Tracking samples
- Managing coupons
- Managing the point of sale
- Billing
- Invoicing
- Fulfilling orders
- Mass customizing products and service

CRM capabilities supported by Business Management Include:

- Managing customer touches
- Managing marketing campaigns
- Monitoring marketing campaign performance
- Managing inventory levels
- Driving mass customization
- Managing cross-sell and up-sell Opportunities
- Customizing marketing channels, such as the Web
- Personalizing communications
- Driving contact centre scripts
- Capturing key performance metrics

CRM capabilities supported by Business Intelligence include:

- Click stream analysis
- Market basket analysis
- Customer segmentation
- Cross-selling analysis
- Lifetime customer Value (LTV) analysis
- Dimensional "What if" analysis
- Customer profiling
- Cluster analysis
- Factor analysis
- Conjoint analysis
- Discriminant analysis
- Pricing analysis
- Market channel profiling

Each of these capabilities can play a key role in the interaction of the enterprise and the customer. Functions of business operations include some capabilities that are not always associated with CRM, such as billing. But a bill is a regular, predictable customer touch. Why not include a cross-sell offer or product coupon with the bill? Many companies now to this, requiring coordination of billing with CRM capabilities. After all, a consumer who often moves an unsolicited mail directly from the mailbox nearly always opens a bill.

Privacy Issues and CRM

The most sensitive aspect of customer relations is privacy. All of us have boundaries, and don't trust people who become too familiar too soon.

From the business perspective, ubiquitous data and information that flow seamlessly from one touch point to another represents a kind of selflessness, regardless of the business from one touch point to another represents a kind of selflessness, regardless of the business model. The goal of every service-conscious business is to understand not only all customers, but their circumstances as well, and this requires information. In addition to the obvious business opportunities, there are numerous consumer benefits for ready access to personal information, no matter where the location is.

Paradoxically, Internet initially gave the illusion of privacy and anonymity. People could voice their opinions on any subject, view pornography, and read any topic they wanted, without disclosing their identity. However, it was a very short, temporary illusion. In the workplace, e-mails as well as the employees activities on the Web are often monitored.

There is currently a hot debate over the rights of companies to create dossiers on consumers without their knowledge and then sell the information to third parties. Other companies such as America Online, which have much more consumer information at their fingertips, have maintained a low profile, America Online, for example, maintains information on 21 million subscribers, including demographics, credit card numbers, and their whereabouts. Although America Online is not currently in the business of selling consumer data, it sells names and addresses to bulk mailers, and buys information about subscribers for targeted advertisements. Some service providers intentionally track subscriber movements with subscribers' knowledge, and sell the information to third parties. Subscribers are given free Internet access and extensive personal profiles.

Tracking consumer –purchasing patterns is not always used with the consumer's best interest in mind. For example, personal tracking data are often used in yield management, a technique designed to maximize reverence and profitability. The idea is that some customers are more profitable than others, especially those placing orders with short lead times. Since suppliers can charge higher prices for orders with short lead times, they reserve capacity for such orders and turn down less profitable, long-range orders. As customers are ranked in terms of profitability and system compatibility, less-profitable customers are deleted from the list and their orders declined. For example, a company may not be able to purchase hotel rooms in bulk for conferences, unless its conferences are to certain minimum size. This mechanism is great for businesses. But may not be appreciated by some customers.

It is now clear that customer relations are based on a timeless, technology-independent, triad-service, trust, and loyalty. Customers have to trust, and loyalty. Customers have to trust that a business is working with their best interests in mind. Without trust. Which is a major contributor to the emotional bond between a business and its customers, there can be no relationship. Furthermore, even the best intentions are worthless without action. A business must repeatedly provide a valuable, consistent service to prove its customers that the company stands behind its marketing rhetoric. If a business provides its customers with a valuable service and develops a trusting relationship, the business can do all it can to galvanize a loyal customer following.

Data Mining in CRM

Over the past few decades, there has been a constant shift in the way the companies react with their customers. Companies have found that they need to know the customers better. And for that they need to quickly respond to their needs and wants. It is no longer possible to wait until the signs of customer dissatisfaction are obvious, before taking action. To succeed, companies must be proactive and anticipate what a customer desires. This has made the companies to invest heavily into CRM.

To be successful, database marketers must firs identify market segments containing customers or prospects with high-profit potential. They then build and execute campaigns that favourably impact the behaviour of these individuals.

The first task, i.e. identifying market segments, requires significant data about prospective customers and their buying behaviours. In practice, massive data stores often impede marketers, who struggle to sift through the minutiae to find the nuggets of valuable

information. Data mining applications automate the process of searching the mountains of data to find patterns that are good predictors of purchasing behaviours.

After mining the data, marketers must feed the results into campaign management software that, as the name implies, manages the campaign directed at the defined market segments. In the past, the link between data mining and campaign management software was mostly manual. Successful companies need to react to each and every one of these demands in a timely fashion. The market will not wait for your response, and customers that you have today could vanish tomorrow. Interacting with your customers is also not as simple as it has been in the past. Customers and prospective customers is also not as simple as it has been in the past. Customers and prospective customers want to interact on their terms,

1. Do we know and understand our supply chain priorities.
2. How should we structure Web-enabled linkages with our customers and suppliers for
    a. Pre-eminent supply chain performance?
3. What e-supply chain approaches can we appropriately invest in for near and longer term business performance gains?
4. Do we have an executive-level champion providing the necessary linkage to to management for effective implementation of e-supply chain management?
5. Have we carefully defined an action plan for pre-implementation preparation activities?
6. What are the missing technical links in our current system or our choice of software?
7. What planning and implementation tasks will be accomplished and when?
8. Do we understand the real benefits of an e-supply chain versus the cost to develop?
9. What e-supply chain strategy will give us the leverage to transform ourselves into marketplace leaders?

Undoubtedly, spending time in the upfront strategy development to improve order-to-Delivery cycle and supply chain management will pay big dividends. The hard part is the prerequisite tasks of discovering and thinking through supply chain opportunities and then developing a strategy and plan for an e-supply chain that will improve a company's performance more than its competitors. But without an e-supply chain roadmap, the direction taken may not take the company to its desired destination. The biggest loss of missing the target can never be regained. It is essential to do it right the first time.

In these days of ERP, information technology and other high-tech systems, the tips presented here may seem too simple. These things are simpler to talk about than to actually execute. But put into effect, their pay off can be tremendous.

E-logistics of UPS

United Parcel Service has introduced UPS e-logistics, a provider of integrated, end-to-end supply chain management packages for e-business. UPS e-logistics is marrying the expertise of its partners Oracle, Price Waterhouse Coopers and EXE Technologies with its global fulfilment and distribution network, information technology infrastructure and logistics expertise of the UPS Logistics Group, to offer a complete range of services to manage the back-end of the e-business supply chain.

The company's services include warehousing and inventory management, order fulfilment, inbound and outbound transportation, returns management, customer call centre and management reporting. UPS e-logistics said that the pre-built services are standardized, can be bundled and configured, and are scalable for future growth.

UPS e-logistics serve both business-to-business and business-to-consumer-commerce clients, ranging from e-business start-ups to the dot-com divisions of established corporations. Nearly a year in the marking, it is the first business to be launched by the UPS e-ventures incubator.

Partners Price Waterhouse Coopers provides over all systems integration consulting and project management services; software maker Oracle Corp. offers full enterprise resource planning with integral order management and advanced planning and scheduling functionality EXE Technologies, a leading provider of multi-channel fulfilment, warehouse and distribution software, provides warehouse management systems at all ups e-logistics distribution centres. United Parcel Service is extending its reach to services traditionally performed by distributors and integrators: logistics fulfilment, call centre support and website development and implementation. And the delivery giant's move could pave the way for other carriers, such as Federal Express, DHL and Airborne Express, to enter or boost their presence in this space down the road.

Question Bank

Q1 Explain E-CRM Solution.
Q2 How technology can help in E-CRM?
Q3 Explain typical businesses touch points.
Q4 Explain Customer relation goal.
Q5 Explain integrated CRM application.
Q6 once a company has acquired customer the key to maximize revenue is keeping
Them. Explain how e-commerce is helpful in customer relation.
Q7 Discuss about how search engine can be used to reach the customer.
Q8 what is E-Branding? Why it is popular in recent years.
Q9 Write a short note on E-CRM toolkit OR Define purpose of E-CRM toolkit.
Q 10 What is Data Mining. How it is useful in CRM.
Q11 Explain Challenges or Privacy issues in E-CRM.
Q12 Explain Customer life cycle in E-CRM.
Q13 Define CRM capabilities in business point of view.
Q14 Explain E-CRM solution.
Q15 Write a short note on: converting clicks to customers.
OR
How you can use clicks as a business touch point to increase customers

Unit 6

E-Supply Chain Management

Supply Chain Management- It Is All About Fulfilling Customers' Needs

Supply Chain Management covers all aspects of a business. From the stage of raw material to the end user, each and every aspect of the cycle is covered by the management system be it sourcing   product design, production planning, order processing, inventory management, transportation and warehousing, and customer service.   This complex sequence of steps used to be very difficult to manage efficiently and in the days when organizations have to fight hard to maintain their bottom-line, optimizing these steps become a necessity.

While you enter a store to buy a certain material, just try to imagine the sequence of steps that had brought the material where you see it. On the material, you will find a price tag with all the details of its date of manufacture, date of expiry, lot number, etc. The shop that you have entered has carefully placed it on the shelf after procuring it from a distributor and noting all these details for billing and tracking future complaints. The store also maintains an inventory of this material and hundreds of similar materials that are available in the store and along with this a minimum stock level and a reorder level. This product, like all other products in the store, has been sourced from a distributor who sourced it from the manufacturer. The manufacturer had procured the raw materials required for the production from one or many of his suppliers. A third-party transport and warehousing infrastructure was utilized to ship the material from the manufacturer to the distributor and from the distributor to the store that you have just entered.

After your purchase is complete, the point-of sale updates this information at various places-the stock level comes down and revenue increase. The information of decrease in stock level should reach the distributor who has to refill the stock before it becomes zero and the distributor is also to be paid his due amount. This chain is again pushed backwards to the lowest level of the supplier who has to supply the material in time. So, there is a constant flow of money and material between these establishments in order to satisfy the needs of the customer.

The Supply chain Management manages the flow between different stages to maximize productivity and minimize stock-outs or overstocking. The solution spans across the different companies involved, and the system used by these companies should be able to talk to each other and understand each other's requirement. An SCM system is a combination of many applications- demand, inventory and transportation planning – covering the stages of the supply chain. The increase in product variety and demand for customized products increases demand

Smart Chains, Smarter gains

An efficient supply chain management can bring down the prices of seller by as high as 40 per cent. This is not with the help of a budget sop, but by reducing average inventory levels, lowering transport costs, lowering warehousing costs, lowering warehousing costs-

among others. Children will be excited on having Maggi at Rs. 6 against the prevalent price of Rs. 10.

Industry estimates show that a company spends between 17 per cent and 50 per cent of the price for just moving the goods from their manufacturing plant to shop shelves. This includes the margin of the retailer and of the distributors. Most of it is taken up by logistics and holding inventory and these costs can be controlled, optimized and reduced, thus reducing price or increasing profit.

Now if we can practically apply this model on a Rs. 50,000 crores FMCG company with thousands of wholesalers and retailers, the result will be mined disorganized. This will not only give the company a cost benefit but will also result in improved customer service levels, improved competitiveness and an overall gain in profitability for the organization.

Managing logistics is a nightmare for all company executives in the sales and purchase departments. Handling logistics not only adds cost to the business but also increase the number of business processes and involves lot of resources. The logistics chain starts from the supplier end, continues to the customer end involving members in surface, air, sea express, couriers, brokers, customs, excise, etc. This is for the sales part. Later it will also include similar contacts for the after sales support, repair and maintenance. Many of the companies cannot take up this load and outsource these activities to experts, and many companies manage this efficiently and make huge profits.

Technology in logistics has been advancing in three phases. The first phase is to monitor the logistics chain. Herein, technology helps companies monitor orders, inventory and shipments with all parties. Since logistics is a business a process at the most basic level. It is used to automate the process to gain visibility. This is primarily done through enterprise-wide software developed in-house or procured from the solutions already available. Companies like Blue Dart, an integrated air express carrier, use an in-house developed package called COSMAT-II (Computerized Online System for Monitoring and Tracking) They started using this software way back in 1989 when very few standard solutions were available, and have improved it all through these years with changing needs of business.

Gati, another Indian pioneer multimodal express cargo company, also uses an in-house system that links their various processes in the logistics chain. Over the years, they have included features like vehicle monitoring system, web enabled access to various applications etc., and The Lemur group has further included warehousing, transportation and distribution system with full visibility of the processes. They found it very useful as they could adapt to any internal or external changes or requirements within hours.

Wal-Mart, starting with P&G has incorporated vendor-managed inventory, category management, and other inter-company innovations. In order to build this strong SCM infrastructure, Wal-Mart entered into an alliance with P&G and in return got a dedicated account team representing key P&G functions of sales/marketing, distribution / supply chain management, IT and Finance. P&G had one Vice President dedicated for this project, who made the CFO of Wal-Mart as his customer. Customer value maximization was their only drive. Over the past decade, Wal-Mart has invited more of its major suppliers to jointly develop powerful supply chain partnerships. These are designed to increase product flow efficiency and, consequently, Wal-Mart's profitability.

Top managers have learned how to integrate their supply chains with major customers like Wal-Mart. What most companies have not sorted through, however, is what to do with all of their other customers. A common answer to the question of how to structure relationships with other customers is to try to apply the Wal-Mart relationship to all customers. This approach is implicit in commonly shown Power Point slides that offer a

view of a company's evolving supply chain role. In one version of this view, the company starts as a stable supplier, evolves into a reactive supplier, then an efficient reactive supplier, then an efficient proactive supplier, and finally becomes a revenue and margin driver. This seems logical, with the company's supply chain capabilities inexorable increasing in experienced over time, enabling the company to develop even more effective integration with its customers.

The problem, however, is that developing Wal-Mart-like supply chain partnerships requires a lot of resources and management attention. It also requires willing, innovative partners. Pursuing this approach too widely would be both costly and stuffy. In the past, Suppliers to the retail trade typically had rather monolithic supply chains. The order fulfilment process was designed with a "one size fits all" approach. Customer generally received the same list price, regardless of ordering efficiency. There was very little effective forecasting. Some inventory priority was given to major customers in the event of allocations. Products were delivered in the manner that customers requested, regardless of the inefficiency entailed.
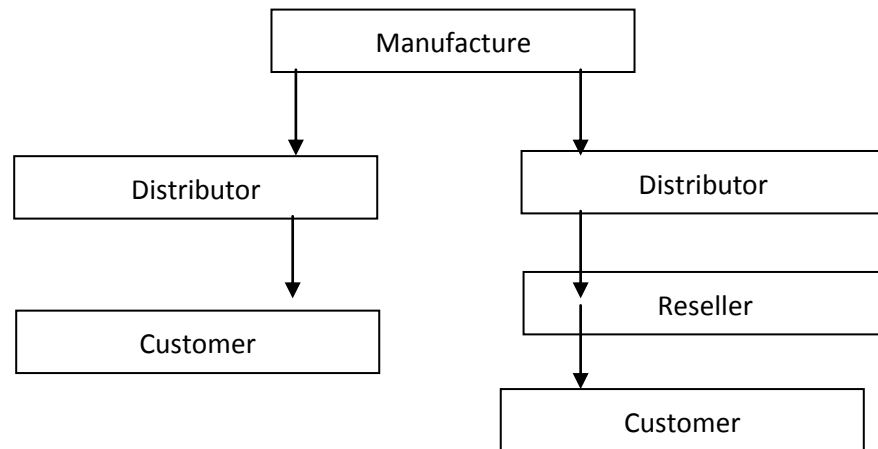
But today, the retailers themselves are changing dramatically. There is very visible consolidation, with the top ten retailers expected to comprise about half of the industry's revenues in a few years. Retailers have very different degrees of willingness to innovate, and the innovators are growing fast. Most retailers were used to having significant buyer power, and many are still very focused on exerting price pressure on their suppliers rather than seeking increased profitability through process innovations. At the same time, the leading retailers are consolidating their supplier bases they are looking more to major suppliers for supply chain innovations and prioritization, and in return, they are giving them increasing shelf space.

As a result of this history, major retail suppliers find themselves stretched. They are forced to meet the increasing needs of their largest customers while they are forced to meet the increasing needs of their largest customers while they are devoting disproportionate resources to their smaller customers. This untenable situation is forcing major suppliers to rethink their account relationships and extended supply chains. The key to providing excellent, consistent service at a reasonable cost is service differentiation. This concept can be adapted to guide the development of an appropriate set of broader supply chain policies. It is essential for successful profitability management, because it enables a supplier to match its cost structure and innovation initiatives to account potential. Service differentiation is also goodfor the customers. It enables them to plan their operations around a very high and consistent level of service. However, it does require that customers establish well-disciplined operations, as the supplier should adhere to a specific set of agreed-upon processes.

What Happens at Dell?

An outstanding example of e-supply chain is the one in force at Dell Computers, the Us-based PC manufacture. The company publicizes its products through the Internet. Any customer can order a PC of a configuration of his choice and pay for it online, using his credit card. Once the order is registered, the e-supply chain takes control of the execution. The system triggers three actions simultaneously- one to Dell's suppliers in Taiwan for providing parts, second to its assembly shop in Singapore, and third to its courier company, with all the data being transferred through the extranet. The intranet takes care of internal transactions relating to realization of collections from customers and effecting payments to the suppliers/service providers. Dell's success lies in reducing

costs and improving customer satisfaction. Figures 6.5 and 6.6 explain how the model for supply chain operates.

```
                        ┌──────────────┐
                        │  Manufacture │
                        └──────┬───┬───┘
                   ┌───────────┘   └───────────┐
                   ▼                           ▼
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        │   Distributor    │        │   Distributor    │
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        ┌──────────────────┐        ┌──────────────────┐
        │                  │        │     Reseller     │
        │     Customer     │        └──────────────────┘
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                                    │     Customer     │
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Fig. 6.5 industry model for supply chain

```
        ┌──────────────────┐
        │   Manufacture    │
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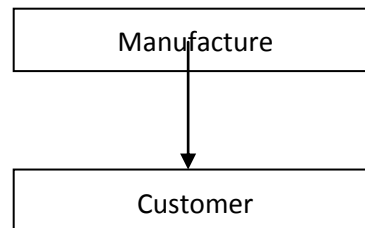
Fig. 6.6 Dell model for supply chain management

Every company aims at reducing costs and cycle time and increasing revenue. E-supply chain supports these objectives. Companies find that enterprise integration leads to a new level of relationship, be it with its customers or suppliers. Customers can quite literally check the status of their orders, and suppliers can gain access to inventory levels to find out whether they need to replenish stock, all through the extranet. The benefits of reduced cycle time provide measurable competitive advantage in terms of both cost and performance. When we speak of cycle time, we refer to the time it takes to react to a new demand from the customers. The faster we move a critical data through the Internet, the quicker we can react and deliver the end product to the customer. This leads to enhanced customer satisfaction and promotes revenue growth.

Seven Ways to Reduce Inventory

How much inventory does he need to run a business effectively, is a perpetual concern of every manager. If he has too much, he may find himself confronted with cash-flow problems; if too little, he runs the risk of customers accusing him of poor service. So what is the way out? Here are seven tips that can help him strike the right balance.

1. **Improve data accuracy**. Introduce a well-designed cycle counting system. It will help you know how much of inventory to have and where you are. A well-designed and implemented cycle counting system pays for itself within a short time.

2. **Cut your lead-time**. If lead-time is long, you cannot but have more inventories in your system. Think of a 'rush' order in one week for a valued customer. The rush order does not wait in the long queue of WIP (Work-in Progress) inventory for something to happen.

3. **Increase the velocity of your operation**. The amount of inventory you have has a lot to do with how fast you can replace it. If for instance, you can replace the same item in one day, a two-day supply will be more than enough to fill any order and, a stock out- if it occurs-will be for only one day. Not until the next batch is produced. On the other hand, if it takes six weeks to replace an item, you will need to re-order with at least six weeks (plus safety stock and Just in Case inventory) supply or be at the risk of a stock out.

4. **Eliminate misalignment from your process**. It is not unusual for companies to buy raw material in thousands, produce product in hundreds, and sell in units. The result is the piling up of inventory that runs the risk of slow movement, outdate and damage, and tie up of valuable cash. 'Just in time' techniques are aimed at eliminating such misalignments.

5. **Clean your attic**. There are companies, which carry an item that typically may be ordered once a year, if at all. Some companies may keep an item in the fond hope that someone will buy it someday or other, or hold on to an item because too most of money was spent on it. The answer to all this is simple, donate or his sale.

6. **Eliminate variation.** Erratic vendors may have product quality related problems to the shop floor, which can cause unnecessary inventory to pile up. The typical was of dealing with such situations is to order early, order more than needed, a increase safety stocks throughout the system.

7. **Replenish based on market demand**. Forecasts may seem advantageous but it may be remembered that many are no more than informed guesses. Using market demand as reference for replenishing finished goods is a better approach to keep your inventory level aligned with what customers are actually buying.

E-SCM Provides "Real-time" Benefits
E-SCM is being transformed by the rapid growth of Internet-based communications; the movement to Internet- based communications represents a paradigm shift from the client server model. The power of Web-based applications is their ability to allow people communicate mission-critical, real-time information anywhere in the world instantaneously This migration has precipitated the widespread adoption of Internet software application utilizing the latest technology to fulfil these new and complex communication needs. These applications emerge, their immediate and measurable

benefit make them essential business tools. With the increasingly competitive business landscape, it has become a strategy necessity to optimize a company's supply chain in a fashion that leverages the potential of the Internet. Some of these are:

- Global trading capabilities
- Mass personalization and customization
- Global knowledge exchange
- Global communities
- Collaborative workflow
- Industry specific (vertical) marketplaces
- Horizontal marketplaces
- Enterprise- to Enterprise connectivity
- E-marketplace-to-E-marketplace connectivity

E-SCM-The Strategic Advantage

Repaid Deployment and Scalability

The E-SCM suite of applications is based on an "open" Internet Application Architecture them to provide enterprise-wide scalability and rapid deployment to numerous end-users.

Real-Time Processing

E-SCM creates an open, integrated system that addresses the complex e-business and supply chain management needs and requirements by allowing the exchange of "real-time' information to take place with employees and their trading partners (customers, suppliers, distributors, manufacturers) regarding product configuration order status, pricing, and inventory availability. Such function improves order accuracy and provides 100 per cent order fulfilment through accurate inventory information.

Return on Investment

In addition to increasing productivity and reducing overall operating expenses, e-SCM maximizes selling opportunities by capturing valuable customer information-buying patterns, frequency of visits, preferences, order history-and then uses this information for up-selling, cross-selling and promotional opportunities, E-SCM provides the tool sets to achieve new business by reaching out to customers that you never could before.

Benefits

Some of the benefits of e-SCM are enumerated below:
1. It is web-based (client and server) not Web-enabled :
2. It incorporates broadcast and active messaging to proactively notify an individual of a condition that requires attention :
3. It supports the exchange of "real-time" information through trading communities such as employees, customers, suppliers, distributors and manufacturers;
4. It has open Internet Application Architecture which allows for rapid deployment and scalability, combining unlimited internal/ external users in a 'real-time' environment;
5. It has an interface capability with any third party software:
6. It is platform independent;
7. It is a fully integrated system;
8. It has web visibility and processing capability -24x7;
9. It is rules-based.

E-Supply Chain Components[1]

The components of e-supply chain are as follows;

Advanced Scheduling and Manufacturing Planning Programme

This automated programmer provides detailed coordination of all manufacturing and supply efforts based on individual customer orders. Scheduling is based on real-time analyst changing strains throughout the process, from equipment malfunctioning to supply interruptions. Scheduling creates job schedules for managing the manufacturing process as well as logistics.

Demand Forecasting Programme

This module supports a range of statistical tools and business forecasting techniques. It constantly takes into account changing market scenarios and economic factors while making decisions.

### Transportation Logistics Programme

This programme facilitates resource allocation and execution to ensure that materials and finished goods are delivered at the right time and at the right place, according to the planning schedule , at minimal cost. It considers such variables as transportation mode and availability of each mode such as airlines, trains, and trucks.

Distribution Planning Programme

This is integrated with demand forecasting, manufacturing schedules and transportation logistics to teach the customer.
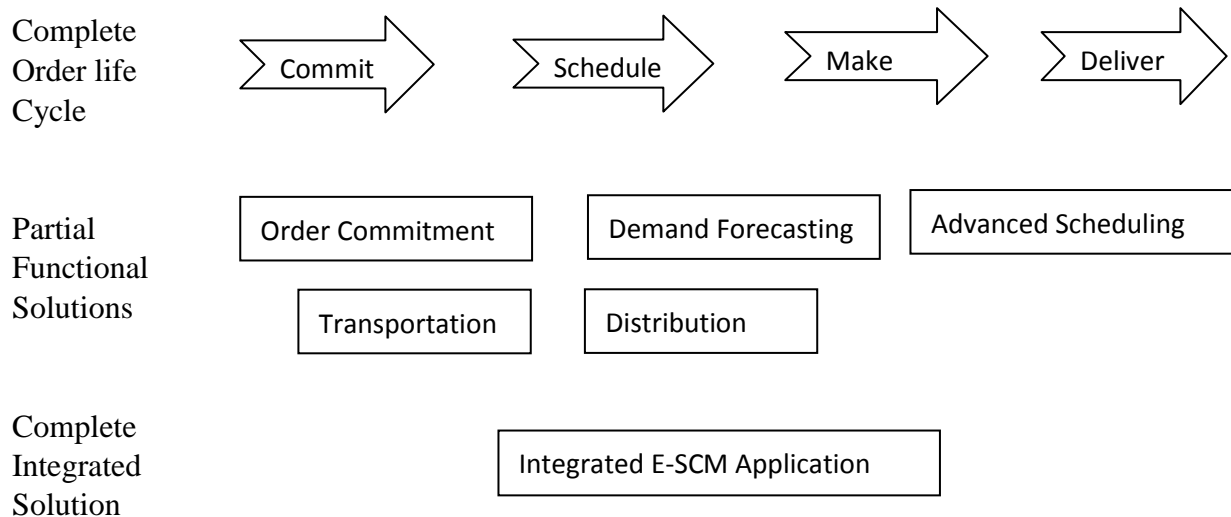
Order Commitment

Order commitment is linked to all the other modules so that accurate delivery of goods and services can be guaranteed. These are illustrated in Figure 6.7
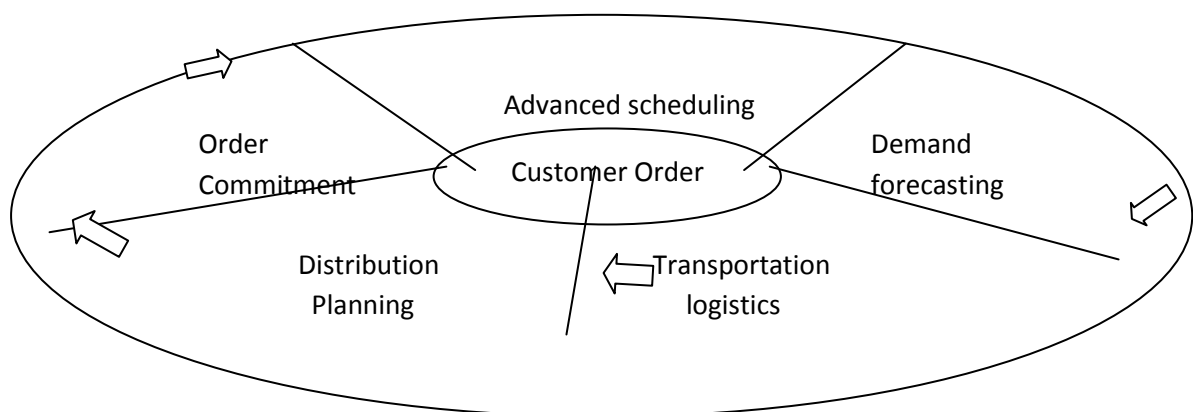
Fig.6.7 E-SCM Components

E-supply Chain Architecture[2]

Historically, the elements in the supply chain have consisted largely of separate legacy applications at the headquarters, factory, store and distribution levels. These applications have targeted only distinct levels of supply chain and not the entire supply chain levels. So this three- tier architecture as found in Figure 6.8 shows a bottom-up view of the entire supply chain management.

Complete Order life Cycle: Commit → Schedule → Make → Deliver

Partial Functional Solutions: Order Commitment, Demand Forecasting, Advanced Scheduling, Transportation, Distribution

Complete Integrated Solution: Integrated E-SCM Application

Fig. 6.8 E- supply chain architecture

For food and other quick-turnaround businesses. As their time quotas shrink, customers look for companies that serve them fast. The message to the marketplace is clear; to succeed, companies must reduce the processing time between search, selection, order entry, and order fulfilment. Delays at any step of the process are unacceptable!

Major Trends in E-SCM

What does e-SCM trend mean for e-business? When one considers the challenge of meeting the demands of busy, time-starved, dissatisfied consumers in an environment of hostile competition, low margins and countless sales outlets selling similar products, it becomes clear that changing the entire business model is the only plausible strategy (see Table 6.1). E-business applications must cut the time customers wait for service. Customers now penalize companies that infringe on their time through delays, mistakes, or inconveniences. If companies do not dispatch processes, customers will go to someone who does it faster. It is very important that managers understand and diagnose the cause behind service delays. They need to analyze if an integrated system can speed-up service. If so, they need to strategize, design and implement such systems as soon as possible. Unfortunately for some

TABLE 6.1
MAJOR TRENDS IN E-SCM

Trends	Characteristics
Consumer trends	Speed of service Self-service. Integrated solutions, not piecemeal products.
Service/ Process trends	Convergence of sales and services; Customization and integration Ease of use: Making service consistent and reliable Flexible and convenient service delivery. Streamlining the supply chain
Organizational trends	Contract manufacturing: Becoming brand-intensive, not capital-intensive Business process outsourcing: retain the core, outsource the rest. Increasing process transparency and visibility. Constant innovation and employee retention
Enterprise technology trends	Enterprise applications: Connect the corporations: Infrastructure convergence: Increase merge of voice, data and video Multichannel integration: Computer telephony integration and voice recognition wireless applications. Leveraging legacy investments : The rise of middleware for Application integration.

Companies, their managers may wake up too late to heed the sound of their customers fists pounding on the counters for faster service.   These companies will not be in business for long.

In the e-business world, innovation is derived from spotting the trend well before anyone else does and from the sophisticated exploitation of information and technologies to create value. It is the senior managers in particular who will be called on to lead the innovation charge. Today, every manager is wondering how the Internet can remake his or her business. In a concerted search for growth, corporations are intent on mastering the art of trend spotting in order to discover new products and services, design new business processes and structures, even to create completely new businesses.

QUESTION BANK

Q.1 Explain E Supply advantages and benefits.

Q.2 Explain E-supply value creation for customer.

Q.3 What are E-Supply Chain goals?

Q.4 Enumerate the advantages and disadvantages in using Internet and Web Technology in supply chain   management.
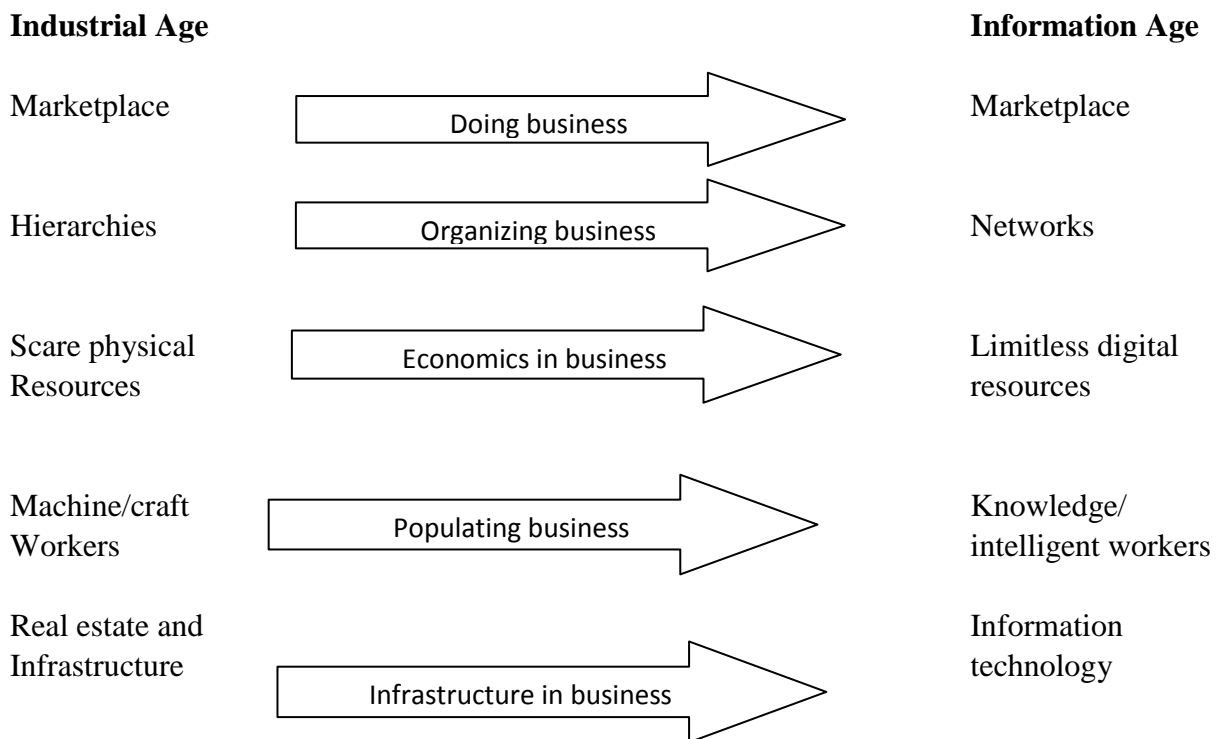
Q.5 Explain how enterprise resource planning and supply chain management software Differs in their goals and implementations.

Q.6 Discuss on Agile Manufacturing in supply chain management

Q.7 Write notes on pull based and push based supply chain management.

Q.8 Write about Efficient Customer Response in supply chain management

Q.9 Present various characteristics of supply chain management.

Q.10 Explain the role of marketing and distribution in supply chain management

Q.11 What is Supply Chain Management? Why is it important in e-business environment?

Q.12 what is supply chain management? Discuss how it is advantageous to E-commerce.

Q.13 Explain the role of EC in i) Supply chain management ii) Retailing

Q.14 Describe the E-Supply Chain management

Q.15 Explain seven ways to reduce inventory in E-SCM.

Q.16 what are the real-time benefits of E-SCM.

Q.17 what are the strategic advantages of E-SCM.

Q.18 Explains in detail E-supply chain components.

Q.19 Explain in detail E-supply chain architecture.

Q.20 Explain major or new trends in E-supply chain management.

Q.21 Explain benefits of E-supply chain management.

Q.22 Explain E-logistics.

Chapter- 7
E-strategy

Introduction

Whether they call it "the post-industrial society", "the third wave" or "the knowledge era" most policy makers, academics and business leaders would agree that we have recently entered a new era. Undoubtedly, some of the defining characteristics of this era - which shall here be referred to as "the information age" – are still to emerge and develop. However, we now recognize that the information age differs markedly from the industrial age in several important respects. These differences can be summarized as in Figure 7.1.

Industrial Age   **Information Age**

Marketplace	Doing business →	Marketplace
Hierarchies	Organizing business →	Networks
Scare physical Resources	Economics in business →	Limitless digital resources
Machine/craft Workers	Populating business →	Knowledge/ intelligent workers
Real estate and Infrastructure	Infrastructure in business →	Information technology

Fig. 7.1 Industrial age vs. information age.

Over the past 40 year or so, many business analysts have tried to determine what has been driving these changes. The consensus has shifted over time. At first, it was thought to be the automating power of computers and computation. Then, it was the ability to collapse time and space through telecommunications. More recently, it is found to be the value-creating power of information, a resource which can be reused, shared, distributed or exchanged without any inevitable loss of value; indeed, value is sometimes multiplied. And today's fascination with competing on invisible assets means that people now see knowledge and its relationship with intellectual capital as a critical resource, because it undermines innovation and renewal.

Information and strategy

All these claims are valid in some ways and therefore, there are diminishing returns to arguing which is the critical motive force. But we can recognize that today every business is an information business. Let us first take the perspective of industrial structure. We see battles in the marketplace all the time, as "content" companies try to acquire related content businesses, not only because of their thirst for information but also because of the opportunities for synergy created by repackaging, reuse and navigation. More significantly perhaps, content companies acquire or build alliances with communication companies, and vice versa. Both sides recognize that to command the airwaves is to command the distribution channels of the information age, and that the high value added opportunities are likely to rely on selling content and repackaging and reusing it in manifold ways. Sometimes, novels are made into television films. That is an example of repackaging opportunity.

It is not just the obviously information-intensive companies that are trying out these when smith Kline Beecham acquired Diversified Pharmaceutical Services in 1994, the purchase was as much about buying the data embedded in prescriptions and healthcare administration processes- which could then guide research and development programmers and sales management – as about more conventional synergies.

When India world was bought by Satyam Online, the sale soon turned out to have a similar information thread. So, we need to rewrite, or at least re-examine, the industrial economic rules of vertical integration and diversification.

Indeed, it becomes difficult in the world of intangible assets and electronic distribution channels to be clear to define vertical or horizontal integration. Microsoft takes stakes in software, communications and information-providing businesses, and America Online acquires Netscape. Are these "horizontal" or "vertical" man oeuvres?

If you choose to take an information perspective, businesses converge, partly because of the integrated e-strategy, true in Figure 7.2. In other words, brand, technology, market and service are the four aspects of e-strategy. In some cases this happens because the product is information-based, as in the cased of Disney and ABC, in other cases, it is because processes are information-based, such as in our pharmaceuticals examples. In still other cases, it is simply because market understanding or decision-making is information-based. So retailers, financial services, organizations and airlines will form alliances because of the information (and sales) Potential of customer cards.
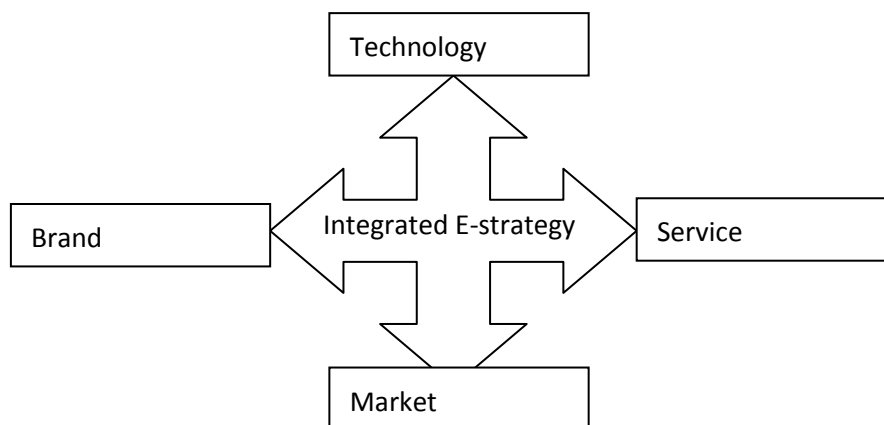
Fig. 7.2 Convergence

While the price-system coordinates the economy, managers integrate activity inside the firm. Increasingly, strategic advantage requires the integration of external activities and technologies.   So, an integrated e-strategy implies integration of technology, brand standing, customer-service and meeting the needs of the market.
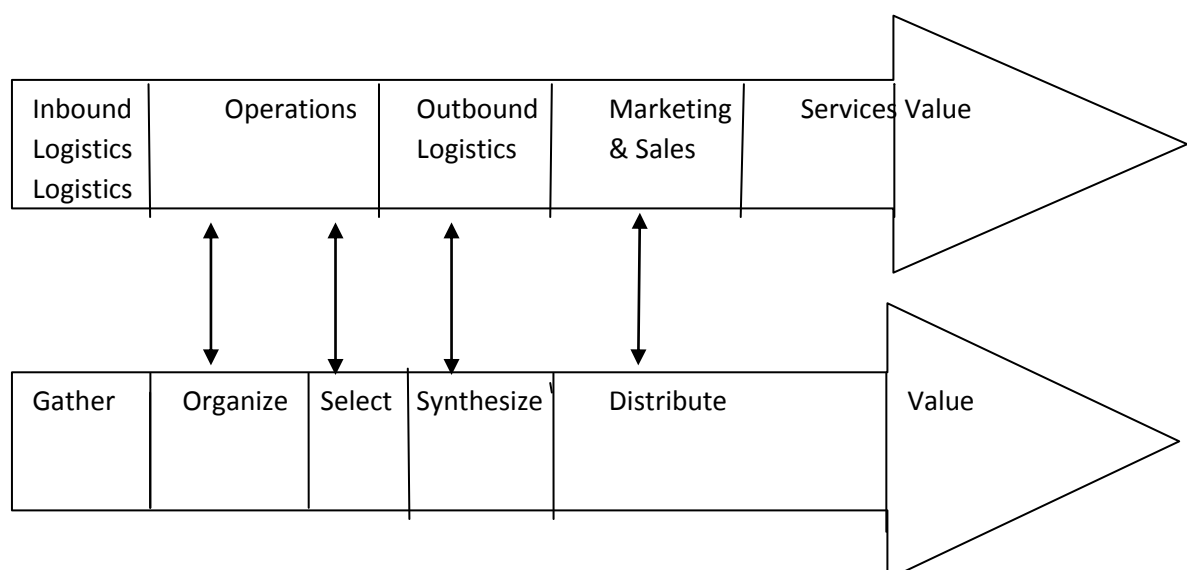
The Virtual Value chain

Information can be captured at all stages of the physical value chain. Such information can be used to improve performance at each stage of the physical value chain and to coordinate across it. However, it can also be analyzed and repackaged to build content-based products or to create new lines of business. Thus, insurance companies, for example, are becoming adept at analyzing customer and claims information and then tele-selling both financial and physical products. A company can also use its information to reach out to other companies, customers or operations, thereby rearranging the value system of an industry; if you like, sectors become "value jigsaws" which can be rearranged so that traditional sector boundaries disappear.
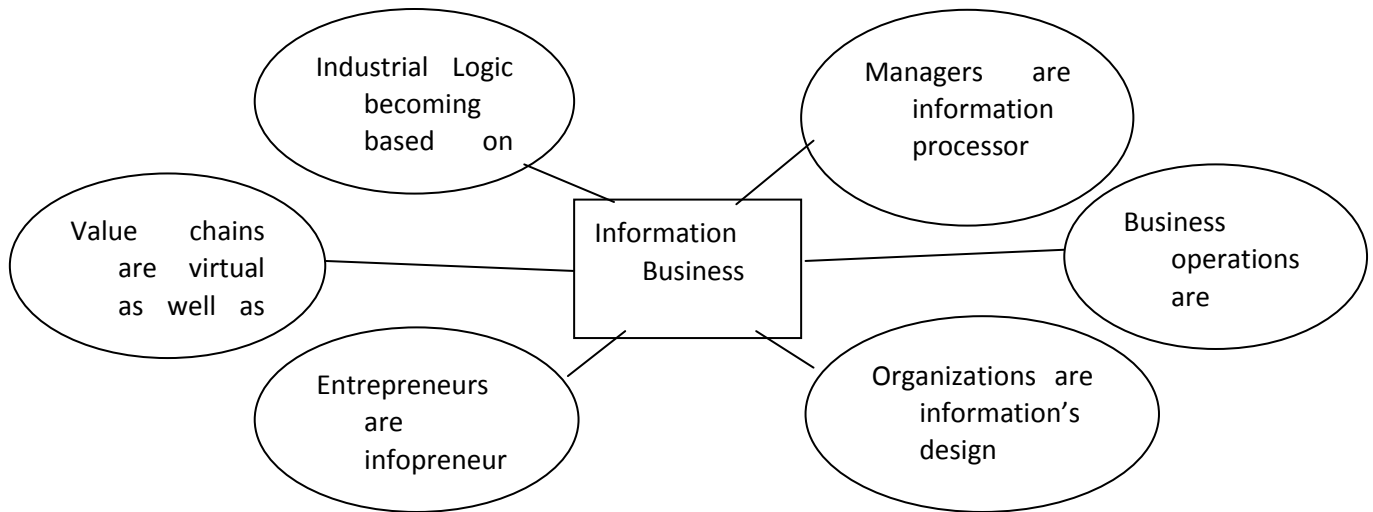
As digital technologies converge, the whole concept of physical value chain undergoes a change. Today the focus is on the virtual value chain, which can be seen in Figure 7.3

And while entrepreneurs are often adept at collecting and processing information about threats and opportunities-by networking, observing and getting about- many look to information and IT as their source of new products and services. The promoter of the future is "infopreneurs"

Figure 7.4 summarizes the discussion so far. From at least six perspectives, every business is an information business. One consequence of this is that either no business

Inbound Logistics Logistics	Operations	Outbound Logistics	Marketing & Sales	Services	Value

Gather	Organize	Select	Synthesize	Distribute	Value

**Fig 7.3The new value chain and the physical value chain**.

Fig 7.4 Every business is an information business.

Strategy is complete without an information strategy. Or that business strategy and information strategy need to be integrated. It information systems and information as a resource no longer just support business strategy; they indeed help to determine it. But what does an information strategy look like?

Figure 7.5 is a conceptual framework which distinguishes Information Systems (IS) strategy from IT strategy. IT, which was about the "how"-the technology infrastructure or platform-often seemed to distract attention from IS which was the "what- the identification and prioritization of systems or applications for development.

Then comes information management strategy, which was about the "who"- the all important question of roles and responsibilities in the delivery, support and strategic development of IS and IT. All of these were influenced by the business or organizational strategy, which was concerned with strategic intent ("why") and organizational architecture. In a perfect world, corporations strove for a good fit between these four domains.
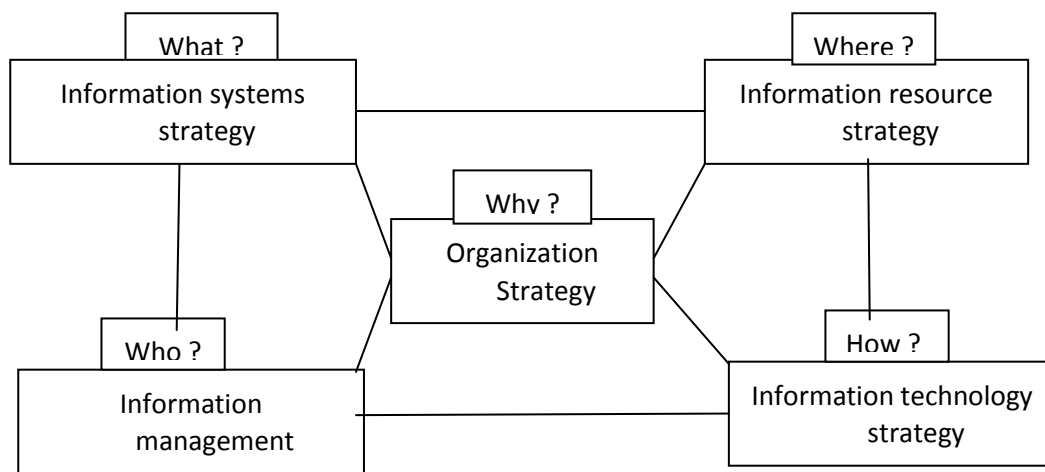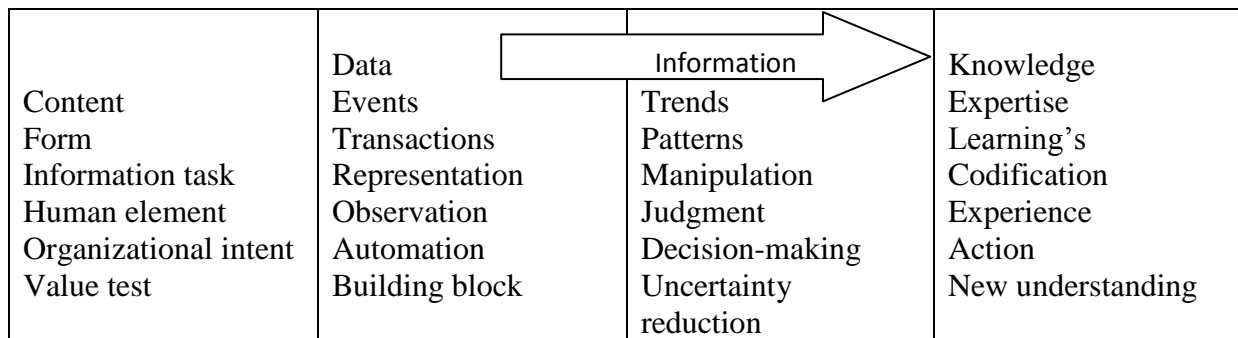
Fig 7.5 Information strategy framework

Now we can see that a fifth domain is missing-one we still find difficult to formalize but in which companies increasingly have objectives, principles and policies. The fifth domain is the domain of information as a resource, or of Information Resource (IR) strategy. It is perhaps the "where" question; where are we going? Much value creation can come from information, but it is not always clear what the end result will look like.

In more traditional content companies, such as advertising agencies, broadcasters and move companies, you will find policies about not giving away or even releasing content that other could reuse. And in financial services companies, you will find executives scratching their heads as to "Why they never collected critical data such as date of birth when their customers registered with them? And "Why information resellers make money out of their transaction data;

One aspect of IR strategy is the increasing interest in the distinction among data, information and knowledge. Some chief information officers and chief knowledge officers believe that such classifications are of little help, and some academics have certainly put their careers behind by agonizing over such questions. Others, however, feel that conceptualizations such as that tin Figure 7.6 offer the solution.

|	Data	Information	Knowledge
Content	Events	Trends	Expertise
Form	Transactions	Patterns	Learning's
Information task	Representation	Manipulation	Codification
Human element	Observation	Judgment	Experience
Organizational intent	Automation	Decision-making	Action
Value test	Building block	Uncertainty reduction	New understanding

Fig 7.6 from data to knowledge

1. To some degree, information is derived from data, and knowledge from information, and thus we are reminded that data has enormous potential- far beyond just being representative of a transaction.

2. Information has characteristic, particularly of human interpretation above and beyond data. Knowledge has something more than information, perhaps learning. A logical test of the value of an additional piece of knowledge could be whether it provides new understanding.

3. Articulating and seeking to classify these intangible resources at least alerts people to their value and, more particularly, to the different sorts of investments they require. Technology is suited to data processing knowledge processing is much more of a human activity.

What are clear are that such frameworks and the past works of philosophers, economists, political scientists, computer scientists, psychologists and management scholars on the nature age. There are some old lessons to be re-learnt but some new rules

and ideas are also required, for the world of information and intangible assets is very different from that of the industrial age and physical assets.

Seven Dimensions of E-commerce Strategy[1]

In order to understand the process of e-commerce strategy, systematic examination of the strategic factors involved has to be considered. Looking at the most successful e-commerce companies, we see a strategy emerging, which is modelled in Figure 7.7
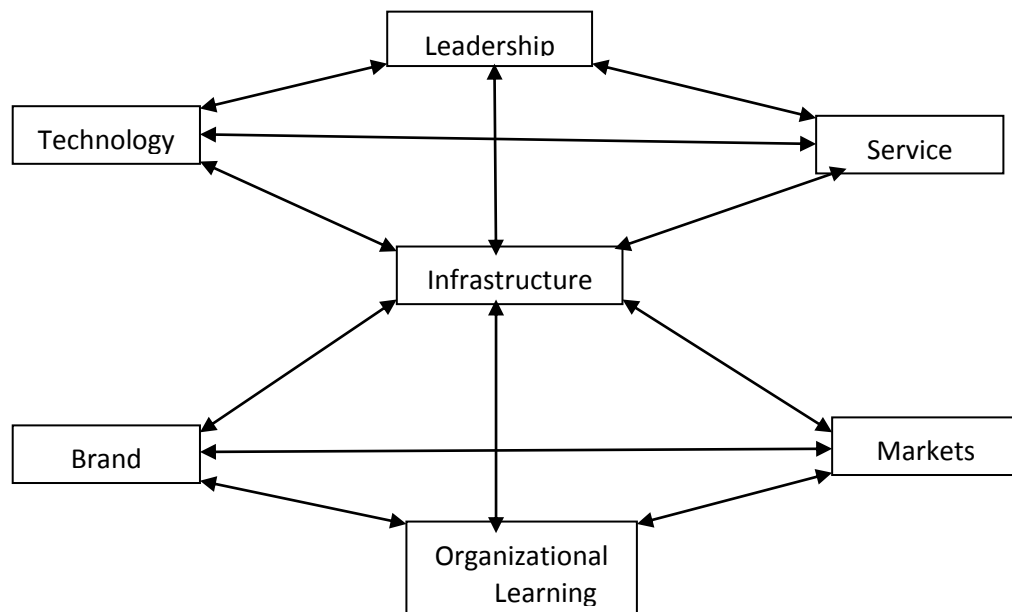
Fig 7.7The seven dimensions of e-strategy.

It can be argued that this model can be applied to all forms of organizations in the traditional sectors. However, this model is especially applicable to assisting the needs of e-commerce strategies. The bonds of an e-strategy lie in the preparation of the ground before the functional issues are addressed. Leadership, organizational learning, and infrastructure form the bonds as shown in Figure 7.8 Clearly; there is a strong interaction among these three components.
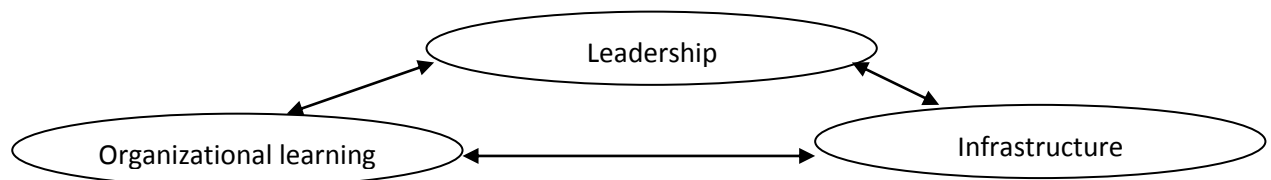
Fig 7.8 the bonds of e-strategy

The primary drivers and the creators of strategic vision in an organization are the CO and the senior executives. The market for intellectual capital in the form of experienced, proven, and successful leadership has never been more extreme. Once the need to develop e-strategy is identified, the single most important issue facing the executives is the IT infrastructure. These spas the technology spectrum from a single internet file serve

connected to an ISP to the information-intense online transaction processing. Leadership with vision facilitates, encourages and allows an environment to develop within the organization, where institutional learning and memory thrive.

Internal Technology Leadership: The 75 Frame work

The essence of the McKinsey's 75 model is that a firm is the comprehensive sum of its parts, and the internal dynamics of an organization clearly determine that organization's ability to compete, the premise being that both the strategy and the structure of the organization determine the management's effectiveness. The McKinsey 75 model attempts to create an awareness of the factors that, when utilized together, will assist in the formation of an organization that is greater than the sum of its parts. The hub and spokes unite the seven factors, as can be seen in Figure7.9 the factors are defined in Table 7.1

The Alignment of Technology and Corporate Planning

The whole basis of technology formulation is the ability of the organization's executive to achieve alignment between the technology strategy and the strategy of the enterprise as a whole

Structure

The second key issue that organizations need to address in leveraging technology towards reaching a position of market space leadership is their ability to manage their internal structural
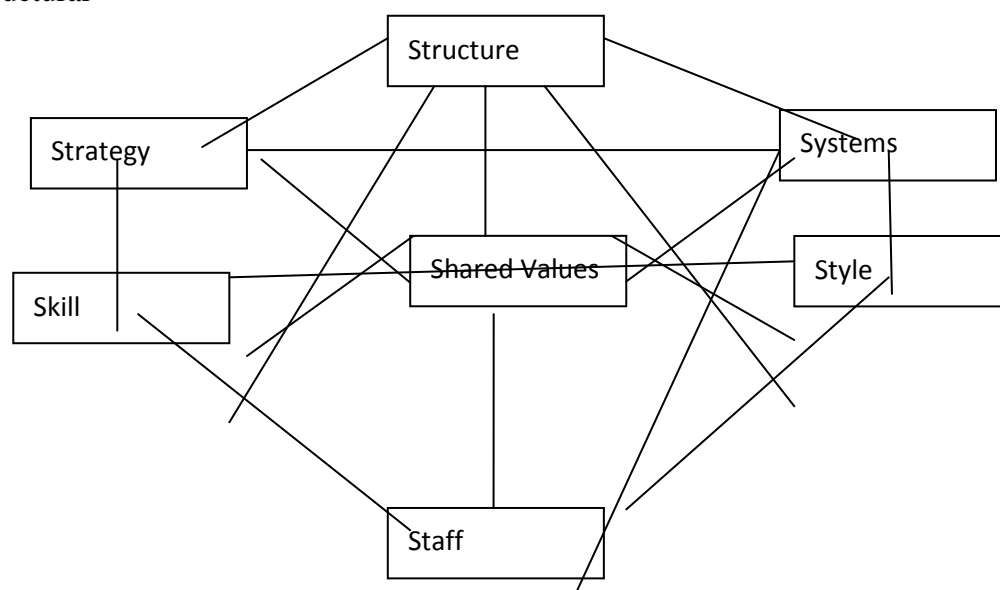
Fig. 7.9 The Mckinsey 75 framework[2]

TABLE 7.1
SEVEN FACTORS OF THE MCKINSEY 75 FRAMEWORK

Component of the 75 framework	Definition
Strategy	Strategy can be defined as the determination of a course of action to be followed in order to achieve a desired goal, position or vision.
Structure	An organization's structure is the interrelationship of processes and human capital in order to fulfill the enterprise's strategic objectives.

Systems	The organization's information systems and infrastructure.
Staff	Human resources management.
Style	Corporate style is a synthesis of the leadership philosophy of executive management, the internal corporate culture generated, and the orient- ation the organization adopts to its markets, customers,
Skills	and competition
	The unique or distinctive characteristics associated with an
Shared Values	organization's human capital.
	The concepts that an organization utilizes to drive towards a common goal through common objective and a common value set.

Dimensions, generally characterized by a company's organizational chart. Organizations must ensure that their structural characteristics facilitate their ability to be flexible and agile enough to effectively and efficiently meet the needs of their markets as they change.

Systems

This is the nervous system through which the organization communicates to its environment. In developing an e-strategy, one of the hidden strength an organization can create is a flexible systems infrastructure. The three major dimensions of technology infrastructure are.

- Enterprise Resource Planning (ERP) systems
- Data warehousing
- Knowledge management

ERP systems can help cut costs across the value chain by re-engineering their processes. For this, the ERP systems should incorporate flexibility without complexity. And to improve their relationships with customers, organizations need to generate information and content that add value from the processes themselves.

Data warehousing can be seen as the basis of a knowledge repository that, when used effectively, enables cost reduction strategies to be identified, added-value services to be achieved at a manageable cost, and the delivery of improved data effectiveness within the organization.

The third dimension of an organization's e-commerce infrastructure is that of knowledge management, an area that can be defined as the formal management of an organization's knowledge resources.

Staffing:

Human capital is the bedrock of any organization. As organizations evolve towards becoming knowledge-based, the value of an organization's intellectual assets cannot be overstated and magnified by a scarcity of IT skills. So outsourcing has been a trend in many organizations.

Skills

The two skills that form the pillars between which the Information Systems structure is supported are the technical skills and relationship management skills.

Style

Style can be defined as 'characterization of how key managers behave in achieving the organization's goals, and also the cultural style of the organization'. Managers succeed and fail in inspiring peak performance, not only according to their ability to appreciate the values and motives of those they direct, but also according to their willingness to align their own managerial styles to the personal, situational and organizational environment.

The bottom line for every effective manager is to deliver results. Since management is also an art, every manager has a personalized way of doing things.

Shared Values

Shared values can be defined as the significant meaning or concepts that on organization utilize to drive towards a common goal through common objectives and a common value set. Key to achieve these is the driver for flexibility in process, for lower transaction costs, and for achieving mass customization for the customers.

Value Chain and E-strategy

This intensity of information in the value chain and in the product offers some clues to the role of e-commerce in an industry. Industries that have information intensity are much more likely to develop quickly into e-commerce than those that do not. An industry with high information intensity, like the computer business, is much more likely to depend on e-commerce than one with low information intensity, like the sand and gravel business.

To determine the intensity of information in one's industry, he has to look at his value activities and value chain. These concepts will help in figuring out what may happen in the future.

Value Activities

Value chain activities are the things that the company does to design, produce, sell, and service products. Typical value activities for a manufacturing firm would be things like;

- Gathering customer needs
- Designing products
- Purchasing materials
- Producing products
- Promoting products
- Selling products
- Servicing Products
- Servicing customers

Assessment of Information Intensity

Assessment of the intensity of information in the value chain and value activities takes the next priority. The industry that has high information intensity in the value chain would have characteristics like those listed below.

- A large number of direct suppliers or customers
- A complex product line
- A product that needs a lot of information to sell
- A product composed of many parts
- Many steps in the production process
- A long order fulfillment cycle time

Next, if there is high information intensity in the products of your industry, it is reasonable to adopt e-commerce. Characteristics of high information intensity in the product would be a product that:

1. Provides information

2. Involves information processing
3. Requires the buyer to process a lot of information
4. Has high user training costs

The Validity of This Technique

Most of the early adopters of e-commerce have come from industries that would score highly if rated on the information intensity scale; those with low scores have not participated so far.

Software business embraced the Web from the beginning and today, much of the business is conducted online. Products are promoted on the Web and sales leads are generated. Product information is supplied to prospective customers on the Internet- not just online brochures but rich, interactive information via demonstrations. Sales transactions are initiated electronically by buyers, orders are fulfilled in some cases by immediate download payment is quickly made electronically via credit, and customer service is delivered by e-mail and Web-based tool.

How do software companies rate on the information intensity scale? The typically need a large customer base to survive. Their products are complex and customers expect a lot of information before they buy. The product mainly provides information and information processing. It typically has a high learning curve and many uses.

As shown in Figure 7.10 we have a very general value chain for Internet commerce. This value chain[3] is focused on the interactions of a business with its customers. The details will certainly be different for different businesses (and for some different business models.)

But we have found this general approach to be very effective in organizing an approach to do business online. The components of this general value chain are the following:

1. Attract customers by means of advertising and marketing; invite and retain the interests of the customers;
2. Interact with customers by means of sales, and convert their interests into 'orders'.
3. Act on customer instructions and manage orders such as order capture, payment and fulfillment.
4. React to customer requests and involve in customer service and offer technical support.
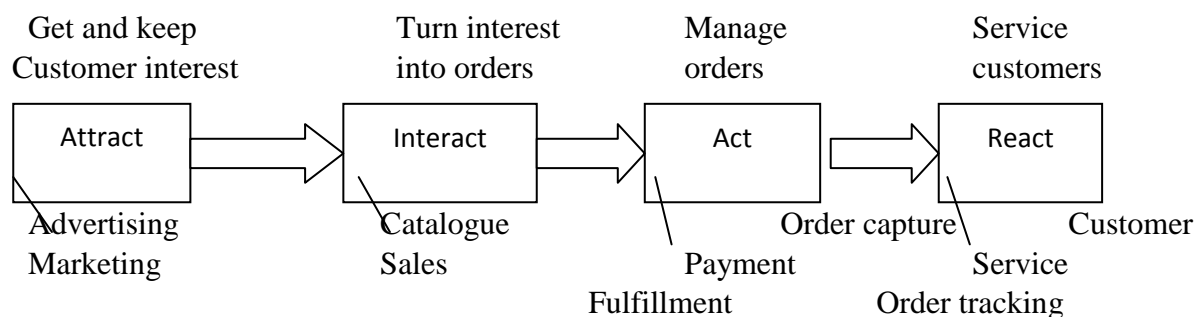
Fig. 7.10 The commerce value chain.

Locking at the value chain for a business helps to define areas of focus such as what the business is best at or where the most emphasis should be given. Even in businesses that

may appear to be very similar, differences in emphasis can have major effects, both for Internet commerce and for more traditional forms.

Components of the commerce value chain

The key components of the value chain can be very different for different industries, and even among different businesses within a particular industry, such as in the following example. In this section, we will look at a generic value chain for Internet commerce. In part it serves as an example of how one might break down a value chain to analyze it more closely, and in part it exemplifies some of the most important components of business on the Internet, throughout this section, we use catalogues for consumer retail purchases as examples. In the next chapter, we will look at several different kinds of business and how the commerce value chain applies to them.

Attract customers:

The first component of the generic Internet commerce value chain is to attract customers. By this we mean, whatever steps we take to draw customers into the primary site, whether by paid advertisements on other websites, e-mail, television, print, or other forms of advertising and marketing. The point here is to make an impression on customers and draw them into the detailed catalogue or other information about products and services for sale. Instead of attract, the catchword today is 'addict' the customers.

Interact with customers

The second component is integration. By this we mean, turning customer interest into orders. This phase is generally content oriented and includes the catalogue, publication, or other information available to the customer on the Internet. The content may be distributed by many different mechanisms, such as the World Wide Web or e-mail. In some cases, there may be links between Internet commerce and contents distributed by other media, such as CD-ROMs.

Editorially, contents may change infrequently or frequently. Technically, content may be static or dynamic. Static content typically consists of prepared pages, such as those from a catalogue, that are sent to a client upon request. These pages must be recreated and updated whenever the information on them changes. Dynamic content, on the other hand, is generated at the time of the request, drawing upon request. Upon one or more information sources to produce an appropriate page of information for the client. Some sources of information for dynamic content include databases, such as a parts database with pricing information, the capabilities with pricing information, the capabilities of client software, such as what graphic formats can be used or even who the clients are, or what organizations they are with. Dynamic content is often used when the editorial content changes frequently, or when the natural storage medium for the information is a database, or when the information, is used for multiple purposes.

Act on Customer Instructions

The next component in the commerce value chain is to act. Once a buyer has searched through a catalogue and wishes to make a purchase, there must be a way to capture the order process payment, handle fulfilment and other aspects of order management.

Order processing: - Often a buyer wishes to purchase several items at the same time, so the order processing must include the ability to group items together for later purchase. This capability, sometimes called a shopping cart in the case of retail transactions, usually includes the ability to modify the contents of the shopping cart at any time. Thus, the buyer is able to discard items, add new ones, change the quantities, and so on. When the buyer is ready to complete the purchase, it is often necessary to compute additional charges, such as sales tax and shipping costs. The order processing system then presents the buyer can pay for the items.

Payment – Depending on the terms of the order, the buyer may pay for it (or provide payment instructions) as part of the order capture. Once an order is finalized, the buyer can of the methods may be online analogies developed especially for a networked system. For example, in an online publishing system, it may be feasible to charge a small amount for a single magazine article, rather than requiring someone to purchase the entire magazine.

The most important property of an online payment system is that the seller can use it to collect payment from the buyer. That is, no matter which payment mechanisms each one may be capable of their must be at least one they can agree on. This property has several suggestions. First, the seller's system must be able to handle the kinds of payment important to the seller's business. For example, credit cards are commonly used for consumer retail transactions, but businesses often buy from each other using purchase orders. There may also be non-technical control on what payment methods can be used. To accept credit cards, a merchant must have an account with an acquiring bank that handles the transactions. Without such an account, creating the technical infrastructure to allow for credit card payment is useless.

Second, the seller must be careful about imposing requirements on the buyer's system. If the buyer must have a particular software package to handle a particular kind of payment system, the universe of possible buyers is likely to be much smaller than it would be otherwise. In some cases, of course, all of the desired customers will have such software, or be willing to obtain it. Again the key point is to keep the customer and the business in mind when selecting the technology.

Note also that completing this stage does not necessarily mean that funds have been transferred into the seller's bank account. Some payment instruments, including both credit cards and purchase orders, extend credit to the buyer who will make the actual payment later. In such cases, it is common for the seller's system to authorize the transaction, whether by requesting such authorization from a third party (such as the bank that issued a credit Card.) or its own internal rules (such as whether a purchase order relationship has been established). As such, final settlement of a transaction may not take place until the item has been shipped.

Fulfilment. Now the order has been placed and the payment made (or at least a satisfactory promise of payment). The next step is fulfilling the order. How that happens depends on the type of thing purchased. If the item ordered is a physical good (sometimes, called a

hard good), it will be delivered to the buyer. The order is usually forwarded to a traditional order processing system, with the result that someone picks up the object, packs it, and ships it. In this case, the online commerce system must have a method for forwarding orders. This step could be as simple as printing out or faxing an order form for a person to handle or it may use a more complicated interface, such as EDI, with another computer system. The precise mechanism, of course, depends on how orders are handled by the rest of the business.

A second kind of order is a request for a service to be performed in the real world. For example, one might order a singing telegram online although the fulfilment happens in the physical world; this is a service, not a physical good. For our purposes, however, we can think of these as being handled like physical goods. The order is passed on to a system or a person who fulfils it.

The third kind of order is more closely tied to the Internet commerce system. We call this category, digital goods. Digital goods include a wide variety of online delivery, including software that is delivered online, magazine or news articles, reports, access to database for a period of time, and so on.

React to Customer Inquiries

Finally, after a sale is complete, the customer may have some questions or difficulties that require service. Although many questions require persons to answer, others can be answered with the appropriate information system. For example, a transaction system. Customers, who wonder whether or not their orders have been shipped, might check back with the system. A more complicated example is how the system handles a failure when delivering a digital good.

Suppose that a customer buys software packing online. While the software is being downloaded to the customer's computer, an error in the network cause the download to fail what can the customer does? Clearly they should not buy the item again, so they need some allow the customer to attempt another download.

Using people to answer customer service calls can be very expensive, so it is worth investing in systems that eliminate questions that do not require the capabilities of a person. As noted previously, these systems often provide routine (or even exceptional) information in response to simple queries. But it is very important to design the system to cater to the needs of the customer in solving any problems that may arise in the process of transaction.

The Quantitative Approach for E-strategy

Speed, round-the clock availability and security are the most common indicators of quality of service of an e-business site. Management faces a two-fold challenge. On the one hand, companies must meet customer expectations in terms of quality of service. On the other reliability, scalability, and security are key issues to e-business site managers E-business sites are complex computer-system architectures, with multiple interconnected layers of software and hardware components, such as networks, caching proxies, routers, high speed links, and mainframes with large databases. The nature of e-business sites are complex computer-system architectures, with multiple interconnected layers of software

and hardware components, such as network, caching proxies, routers, high speed complex due to its transactional nature, secure requirements, payment protocols, and the unpredictable characteristics of service requests over the Internet. Planning the capacity of e-business sites requires more than just adding extra hardware. In requires more than intuition. Ad hoc procedures and rules of thumb. There are many possible alternatives and one has to be able to determine the most cost-effective architecture. This is where the quantitative approach of this book and capacity planning techniques for e-businesses come into pay.

Planning the E-commerce Project

A successful business plan for an e-commerce initiative should include the following activities.
1. Identifying the initiative's specific objectives
2. Linking objectives to business strategies.
3. Managing the implementation of business strategies.
4. Overseeing the continuing operations of the intuitive, once it is launched.

In setting the objectives for an e-commerce initiative, managers should consider the strategic role of the project, its intended scope, and the resources available for executing it.

Identifying Objectives

Businesses undertake e-commerce initiatives for a wide variety of reasons. Common objectives that a business might hope to accomplish through e-commerce could include increasing sales in existing markets, opening new markets, serving existing customers better, indentifying new vendors, coordinating more efficiently with existing vendors, or recruiting employees more effectively.

Resource decisions for e-commerce initiative should consider the expected benefits and expected costs of meeting the objectives. These decisions should also consider the risks inherent in the e-commerce initiative and compare them to the risks of inaction a failure to ac could concede a strategic advantage to competitors.

Linking Objectives to Business Strategies

Businesses can use downstream strategies, which are tactics that improve the value that the business provides to its customers. Alliteratively, businesses can pursue putrefies that focus on reducing costs or generating value by working with suppliers or inbound logistics.

You have already learnt about the different things that companies do on the Web. Although the Web is a tremendously attractive sales channel for many firms, companies can use e-commerce in a variety of ways to do much more than selling; they can use the Web to improve their business strategies and their competitive positions. As described in earlier chapters of this book, e-commerce opportunities can inspire businesses to undertake activities such as:
- Building brands

- Enhancing existing marketing programs
- Selling advertising
- Improving after-sale serviced and support
- Purchasing products and services
- Managing supply chains
- Operating actions
- Creating virtual communities and web portals.

Although the success of each of these activities is measurable to some degree, many companies have undertaken these activities on the Web without setting specific, measurable goals. In the mid 1990s the early days of e-commerce- businesses that had good ideas could start a business activity on the Web and not face competition. Successes and failures were measured in broad strokes. A company would either become the amazon.com or the eBay of its industry, or it would disappear, either slipping into bankruptcy or be acquired by another company.

As e-commerce is now beginning to mature, more companies are taking a closer look at the benefits and cost of their e-commerce projects. Measuring both benefits and costs is program at the Massachusetts Institute of Technology, funded by Procter & Gamble, Gillette, Wal-Mart, Unilever, Tesco, Target, and other corporations. One of the goals of the Auto- program is to keep store-shelves full. On any given afternoon. 8 per cent of the items that US shoppers are looking for are out of stock. Auto-ID uses passive tags that respond to a specific radio signal. A tiny capacitor on the chip stores enough energy from the incoming signal to send out a response. The tags only respond when near device. The tags also have a miniature chip and enough memory to keep track of a digital identity. The memory is of 96 bits, tiny by computer standards but provides a huge number of combinations of ones and zeros.

The technology is set up to identify more than 268 million manufacturers with more than a million individual products each. The memory stores an electronic product code. Or EPC.

Mobile Health services

There is a growing need for the wireless services in health care and medicine. In the US, the Institute for Safe Medication Practices has called for the elimination of handwritten prescriptions by 2003. The provision of wireless hand-held devices means that prescribing can be done electronically. In addition, other tasks that can be carried out wirelessly include billing, lab ordering, referrals, and clinical decision support. The same technology could be used to reduce medical error or give health care providers the information resources to make life-critical decisions whilst on the move.

The benefits of the wireless technology can be illustrated with a number of different examples. Patient information can be obtained by health care professionals from any given location because they can be connected wirelessly to the institution's information system. Physicians access to patient histories, lab results, pharmaceutical information, insurance information and medical resources would be enhanced immeasurably, thus drastically improving the quality of patient care. Hand-held devices can also be used in home healthcare as for example, effective monitoring of blood sugar and blood pressure levels.

Connecting hospitals wirelessly does not impersonalize medicine or change the way a physician interacts with a patient. Yet it gives opportunity for efficient collection of information. Entered on hand-held devices-information which is then easily made available to any health care professional that is able to access it from the hospital's wireless LAN. In exactly the same way, a change in the status or location of a patient can be immediately documented wirelessly, and medication profiles can be checked. The ultimate effect of Wireless local Area Network (WLAN) is to free hospital staff from the tether of a stationary PC. Where handhelds are in use, there are two operating systems vying for market share-Palm OS and Windows CE. The Palm OS is currently the most popular, a likely reason being its comprising over 90 per cent of all new WLAN installations. In 2001, the 802, 11b standard became the format of choice within the hospital segment. Network unit sales in this marked continued. To be brisk into 2002, with a noticeable demand increase for the newly released 802.11 a chipset-equipped hardware.

The sensitive nature of patient's medical records has made information protection a genuine concern among buyers of 802.11b products. Currently, the only native wireless encryption system that exists to safeguard data during transmission is the Wireless Equivalent Protocol (WEP) that utilizes basic access control mechanisms such as user authentication. Keys. The reported design flaws in WEP architecture are now forcing 802.11 working group committees to consider viable add-on encryption schemes for the ultimate goal of a secure WLAN environment.

TABLE 7.2

PROJECTED USE OF WIRELESS DATAAPPLICATIONS 2000-2005[4]

(In millions)

Application	2000	2001	2002	2003	2004	2005
Messaging	100	230	399	611	916	1268
E-commerce / retail	12	36	107	195	318	469
Financial services	50	123	225	357	529	798
Intranet (corporate)	5	20	49	81	129	206
Internet, WAP	4	20	85	183	344	614
Entertainment	61	143	246	372	554	775
Navigation	47	146	239	345	488	785

Technologies for Mobile Commerce

Wireless Spectrum

The electromagnetic spectrum, or simply spectrum, is the entire range over which communicating devices transmit energy waves. The electromagnetic spectrum is assigned common groupings of energy waves, commonly called airwaves that make bands of the spectrum. Over the airwaves, TV, radio, cell phones, or any wireless Internet devices communicate with a transceiver, Each kind of transceiver uses dedicated frequency ranges that are measured in hertz (Hz); I Hz is one cycle per second.

An interesting property of the spectrum is that higher frequencies travel shorter distances. They take more power to transmit. With enough power, they can be life- threatening Higher frequencies can be modulated to carry more bits per second than longer waves,

but they are subject to atmospheric interference. Broadcasters generally prefer owning a lower frequency because it costs less to transmit a signal, it carries farther, and it is generally "safer".

The US federal communications Commission (FCC) and similar agencies around the world break up the spectrum and assign bands for specific purposes. Bands are ranges of frequency with common mames.   Worldwide bodies. Such as the International Telecommunications Union (ITU), also make frequency agreements, so that devices will operate clearly worldwide, Regulating radio interference is necessary so that wireless devices do not interfere with one another. To prohibit interference from a neighbouring transmitter, the FCC restricts bands of coverage.

The owner of popular mobile cellular bands must obtain an FCC license, which guarantees the owner, exclusive use in territory.   Other parts of the spectrum go unlicensed, such as the Instrument Medical Scientific (ISM) at 2.4 GHz and Unlicensed National Information Infrastructure (U-NII) at 5 GHz. Unlicensed sections of the spectrum are open to use by any transmitting device. It may interfere with, and- to express colourfully -it may step on the signal of another wireless devices.   With intelligent signal processing, interference conflicts can be minimized.

Over the time, the FCC has been licensing higher spectrum with wireless technology. In the 1980s. The FCC licensed 800 MHz for cell phones; this part of the spectrum sits above the established AM and FM spectrum. When cellular spectrum was used up in 1996, the FCC auctioned off the higher-spectrum 1900 MHz licenses to operate at a lower power range called Personal Communications Services (PCS). Your cell phone today typically uses either the 800 MHz or the newer 1900 MHz band of spectrum to transmit signals. A 'DUAL-band' cell phone can use either of these parts of the spectrum.

Strategies for website development

When companies began establishing their presences on the Web the typical website was a static brochure that was not updated frequently with new information and seldom had any capabilities for helping the company's customers or vendors transact business. As websites have become the home not only of transaction processing but also of automated business processes of all kinds, these websites have become important parts of companies' information systems infrastructures.

The transformation occurred rapidly, taking only a year or two for most companies. But very few businesses have caught up with the changes in terms of how they develop and businesses today manage them as the dynamic business applications they have now become. The tools that companies have developed over the years to manage software development projects are designed to help those companies meet the needs of their current customers, and operate more effectively within existing value chains.

Many large and medium-sized companies have found it extremely difficult to develop few information systems and websites that work with such systems to create new markets new ways of working with their customers and suppliers by reconfiguring supply chains have had the luxury of time- in many cases, years to complete those reconfigurations. However, the speed at which the Internet has changed markets and marketing channels throughout entire industry value chains precludes lengthy reconfigurations.   Now companies that want to successfully adapt to the changed business environment of the information age must explore alternatives to traditional systems development methods.

Internal Development vs. Outsourcing

Although many companies would like to think that they can avoid electronic commerce site development problems by outsourcing the entire project, savvy leaders realize that they cannot. No matter what kind of e-commerce3 initiative a company is contemplating, the initiatives success depends on how well it is integrated into and supports the activities in which the business is already engaged. However, few companies are large enough or have sufficient in house expertise to launch an electronic commerce project without some external help Even Wal-Mart, with an annual sale of more than $150 billion, did not undertake is 2000 website prelaunch all alone. The key to success is finding the right balance between outside and inside support for the project. Hiring another company to provide the outside support for the project is called outsourcing.

The Internal Team

The first step in determining which parts of an e-commerce project to outsource is to create an internal team that is responsible for the project. This team should include people with enough knowledge about the Internet and its technologies. To know what kinds of things are possible? Team members should be creative thinkers who are interested in taking the company beyond its current boundaries, and they should be people who have distinguished themselves in some way contributing exceptionally to the company. If they are not already recognized by their peers as successful individuals, the project may suffer from lack of credibility.

Some companies make the mistake of appointing as e-commerce project leader. A technical wizard who does not know much about the business and is not well known throughout the company. Such a choice can greatly increase the likelihood of failure. Business knowledge, creativity, and the respect of the firm's line managers are all much more important than technical expertise in establishing successful e-commerce.

Measuring the achievements of this internal team is very important. The measurements do not have to be monetary. Achievement can be expressed in whatever terms are appropriate to the objectives of the initiative. Customer satisfaction, number of sales leads generated, and reductions in order- processing time are examples of metrics that can provide a sense of the teams, level of accomplishment. The Measurements should show how the project is affecting the company's ability to provide value to the consumer.

Increasingly, companies are recognizing the value of the intellectual capital they have built up in the form of employee's knowledge about the business and its processes. In the past many companies ignored the value of their human assets because they do not appear in the accounting records or financial statements. Lief Envision has pioneered the use of human capital measures at Skandia Group, a large financial services company in Sweden of customer loyalty and business partnerships as part of the company's intellectual capital. This networking approach to evaluating intellectual capital shows promise as a tool for assessing and tracking the value of internal teams and their connections to external consultants. These measurements are just now being adapted for use in measuring systems development efforts.

The internal team should hold ultimate and complete responsibility for the e-commerce initiative, from the setting up of objectives to the final implementation and operation of

the site. The internal team will decide which parts of the project to outsource (and to whom hire for the project. Consultants, outsourcing providers, and partners can be very important early in the project because they often develop skills and expertise in new technologies before most information systems professionals do.

Early Outsourcing

In May e-commerce project, the company outsources the initial site design and development to launch the project quickly. The outsourcing team then trains the company's information systems professionals in the new technology before handing the operation of the site over to them. This approach is called early outsourcing. Since operating an e-commerce site can rapidly become a source of competitive advantage for a company, it is best to have the company's own information systems professional in the new technology before handling the operation of the site over to them this approach is called early outsourcing. Since operating an e-commerce site can rapidly become a source of competitive advantage for a company, it is best to have the companies own information systems in which people work closely with the out-sourcing team and develop ideas for improvements, as early as possible, within the tenure of the project.

Late Outsourcing

In the more traditional approach to information systems outsourcing, the company's information systems professionals do the initial design and development work, implement the system, and operate the system until it becomes a stable part of the business operation. Once the company has gained all the competitive advantage provided by the system, the maintenance of the e-commerce system can be outsourced so that the company's information systems professionals can turn their attention and talents to developing new technologies that will provide further competitive advantage. This approach is called late outsourcing. Although for years late outsourcing has been the standard for allocating scarce information systems talent to projects, e-commerce initiatives lend themselves more to the early outsourcing approach.

Partial Outsourcing

In both the early outsourcing and the late outsourcing approaches, a single group is responsible for the entire design, development, and operation of a project group-either inside or outside the company. This typical outsourcing pattern works well for many information systems projects. However, electronic commerce initiatives can benefit from a partial outsourcing approach too. In partial outsourcing, which is also called component outsourcing, the company identifies specific portions of the project that can be completely designed, developed, implemented, and operated by another firm that specializes in a particular function.
Many small websites outsource their e-mail handling and response function. Customers expect rapid and accurate responses to any e-mail inquiry they make of a website with which they are doing business. Many companies like to send an automatic order confirmation via e-mail auto-response functions on an outsourcing basis.
Another common example of partial outsourcing is an electronic payment system. Many vendors are willing to provide complete customer payment processing. These vendors

provide a site that takes over when customers are ready to pay and returns the customers to the original site after processing the payment transaction.

Internet service providers (ISPs) offer Web hosting services to companies that want to operate e-commerce site but that do not want to invest in the hardware and the staff needed to create their own Web servers. ISPs are usually willing to accommodate requests for a variety of service levels. Small businesses can rent space on an existing server at the ISP's location. Larger companies can purchase the server hardware and have the ISP install, and maintain it at the ISP's location. Larger companies can purchase the server hardware and have the ISP install, and maintain it at the ISPs Location. ISPs provide the continuous staffing and expertise needed to keep an e-commerce site up and running 24 hours a day, seven days a week. Most ISPs offer a wide range of services, including personal Web access for individuals. Some ISPS specialize in services to business. These larger ISPs cater to companies that want to operate e-commerce sites. They usually offer wider bandwidth connections to the Internet than smaller ISPs, and offer more reliable and continuous service.

A number of ISPs and other firms offer services beyond basic Internet connectivity to companies that want to do business on the Web. Many of these services were described earlier as candidates for partial outsourcing strategies, and include automated e-mail response, transaction processing, payment processing, security, customer service and support, order fulfilment, and product distribution.

Selecting a Hosting Service

For larger website implementations, the team will want to obtain the advice of consultants or other firms that rate ISPs and CSPS, such as Keynote Systems and the Directory of Internet Service Providers published by Board watch Magazine. The most important factors to evaluate when selecting a hosting service include:
- Functionality
- Reliability, hand width and server scalability
- Security
- Back-up and disaster recovery
- Cost

Companies that sell hosting services provide different features and different levels of service. The functionality offered by a service provider can include credit card processing and the ability to link to existing databases that store customer and product information. Some tracking software provides much more detailed information and easy-to-use report generators than other tracking software. You should determine the functionality offered by a hosting service and carefully evaluate whether that functionality will be sufficient to meet the needs of your website.

The service should offer a guarantee that limits possible down time. E-commerce buyers expect hosting services to be up and running 24 hours a day, every day. Of course, no hosting service can promise never-to-fail service, but some can provide staffing and back-up hardware that minimizes reliability problems. Coordination of this function with the service provider can be very important. Usually, a business must have some round-the clock staff available or on-call to work with the service provider when an interruption occurs.

The bandwidth of the service's connection to the Internet must be sufficient to handle the peak transaction loads that its customers require. Sometimes a service provider will sign up new accounts faster than it can expand the bandwidth of its connections, resulting in access bottlenecks. A guarantee that specifies bandwidth availability or server response times is worth negotiating into a service provider contract. If you expect your site's traffic to increase rapidly, it is important that your service provider increases rapidly the server capacity and the band width provided. In general larger hosting services can scale up more easily than smaller hosing services. Again, it is worth negotiating some scalability into the service provider contract in such situations.

Since the company's information on customers, products, pricing, and other data will be placed in the hands of the service provider, the vendor's security policies and practices how it implements security. No matter what security guarantees the service provider offers, the company should monitor the security of the e-commerce operation through its own personnel or by having a security consulting firm. Security consultants can periodically test the system and launch attacks on the security features used by the service provider to determine whether they are easily breached.

The hosting service should be able to guarantee close to 100 per cent reliability by having a workable disaster recovery plan in place. In addition to having off-site data back-up or mirroring, the hosting service should have a way to restore your site very quickly in the case of a natural disaster? Service providers offer many different pricing plans for will require, and having a goods estimate of the range of transaction loads the site is likely to generate, can help in negotiating a price for the hosting services a price for the hosting service.

Question Bank

Q.1 what is the virtual value chain and information strategy framework?

Q.2 Explain Seven Dimensions of E-Commerce Strategy.

Q.3 Explain following-Value Chain and E-Strategy, Strategies for Web Site Development

Q.4 Explain E- strategy/IT strategy

Q.5 what is IT Strategy and Why it is Important?

Q.6 Explain Alignment of IT Strategy to Corporate and Business Strategies

Q.7 Explain the relationship between Value Chain and E-Strategy.

Q.8 Explain strategies for Web Development.

Q.9 Write a short on Virtual Value Chain.

Q.10 Explain the importance of values chain and E-strategy

Q.11 Write down step by step procedure of web site development in detail.

Q.12 what are the planning require for E-commerce business?

Q.13. Explain value activities in Virtual Value Chain.

Q.14 Explains components of commerce value chain.

Q.15 Explain different strategies or steps in planning the E-commerce project. OR Write down step by step procedure of E-commerce web site development in detail

Q.16 what is data mining. Explain its applications in E-business.

Q.17 what is data warehousing. How it is useful in E-business.

Chapter 8
Mobile Commerce

Wireless Application Protocol (WAP)

Wireless Application protocol (WAP) was invented and driven by the WAP Forum – a group originally formed by Nokia. Ericsson, Motorola and Phone. Com in 1997. WAP is an open specification that offers a standard method to access Internet- based content and services from wireless devices such as mobile phones and PDAs (personal Digital Assistants) The embedded browser , and the operators network that optimizes the transmission of the content software that connects to a WAP Gateway (software infrastructure residing in for the wireless URL. The content for wireless devices can be stored on any Web server on the Internet. Content must be formatted suitably for the mobile phone's small screen and low bandwidth/ high latency connection. Content is written in a markup language called Wireless Markup Language (WML) WML script enables client side intelligence.
The main benefits of WAP include:
1. Non-proprietary method to access Internet-based content and services.
2. It is network independent
3. It has been adopted by 95 per cent of handset manufacturers and being implemented by the majority of carriers.
4. WAP browsers can be built on top of any operating system, including PalmOS, FPOC, Windows CE, FLEXOS, OS/9, JavaOS, etc.

Origins of WAP

While all the four companies that founded the WAP Forum had a hand in the currently available WAP technology set, its basis was a gift from Phone. Com the company incorporated in 1994 as Libras Inc., changed its name twice: first to Unwired Planet and then to Phone. Com. By November 1995 the company hosted the first public demonstrations of its U. P. Browser a micro-web browser for cellular phones.
While HTML and related technologies such as Java Script, Java, and Flash work well for desktop computers and laptops with large displays, it is a poor markup language for devices with small screen and limited resolution. Colour graphics, animation, and sound, challenge the developers under the best of conditions. Additionally, these types of devices lack the processing power and memory to handle multimedia.
To combat this, Phone.Com developed a set of technologies related to HTML but tailored to the small screens and limited resources of hand-held, wireless devices, Most notable is Handheld Device Markup Language (HDML) HDML on paper looks similar to HTML, but has a feature set and programming paradigm tailored to wireless devices with small screens.
Between November 1995 and June 1997, Unwired Planet negotiated major contracts with many prominent cellular phone makers to use their HDML-based U P. Browser, and with cellular phone infrastructure companies to install U P Link Servers to handle requests from the UP Browser. Mitsubishi demonstrated the U P Browser running on their Mobile Access Phone in January 1996. AT & T wireless, Bell Atlantic Mobile Samsung,

QUALCOMM, and GTE quickly followed with announcements that they too would utilize Unwired Planet's technology.

In June 1997, Unwired Planet, along with Ericsson, Nokia, and Motorola, announced the formation of the WAP Forum. Instead of fighting imminent competition from other companies offering their own standards, these companies sought to make their technologies the standard for mobile Internet access. Unwired Planet offered HDML- the markup language, and the Handheld Device Transport Protocol (HDTP); Nokia brought their Smart Messaging protocol; Ericsson offered their Intelligent Terminal Transfer Protocol (ITTP). This alphabet specification. This specification is a set of documents describing the protocol. There are several of them and, they are long and technical. They cover everything from the overall architecture and security information to the binary format of a WAP application and a description of WML Script (similar to Java Script). The documents contain enough information for any developer to learn the minutiae needed for creating WAP- based products.

PHILOSOPHY of WAP[5]

WAP take a client / server approach. It incorporates a relatively simple micro-browser into the mobile phone, requiring only limited resources on the mobile phone. This makes WAP Suitable for thin clients and early smart phone. WAP puts the intelligence in the WAP Gateways whilst adding just a micro-browser to the mobile phones themselves. Micro-browser-based services and applications reside temporarily on servers, not permanently in phone. The WAP is envisaged as a comprehensive and scalable protocol designed for use with any mobile phone- from those with a one-line display to a smart phone-and any existing or planned wireless service, such as the Short Message Service, Circuit Switched Data, Unstructured Supplementary Services Data (USSD) and General Packet Radio Service (GPRS) Indeed the importance of WAP can be found in the fact that it provides an evolutionary path for application developers and network operators to offer their services on different network application developers and network operators to offer their services on different network types bearer, and terminal capabilities. The design of the WAP standard separates the application elements from the bearer being used. This helps in the migration of some applications form SMS or CSD to GPRS for example WAP has been designed to work with all cellular standards and is supported by major worldwide wireless leaders such as AT&T Wireless and NTT DoCoMo, and multiple input terminals such as keypads, keyboards, touch screens and styluses.

WAP embraces and extends the previously conceived and developed wireless data protocols. Phone. Com created a version of the standard HTML Internet protocols designed specifically for effective and cost-effective information transfer across mobile networks. Wireless terminals incorporated HDML (Handheld Device Markup Language) micro-Brower, and phone. Com's Handheld Device Transport Protocol (HDTP) then linked the terminal to the Uplink server suite that connected to the Internet or intranet where the information being requested, resides. The Internet site content was tagged with HDML. This technology was incorporated into WAP, and then renamed using some of the many WAP related acronyms such as WMLS, WTP, and WSP, Someone with a WAP- compliant phone uses the in-built micro-browser to make a request in WML, a language derived from HTML especially for the information from an Interest in WML, a language derived from HTML especially for wireless network characteristics. If the content being retrieved is in HTML format, a filter in the WAP Gateway may try to

translate it into WML. A WML scripting language is available to format data such as calendar entries and electronic business cards for direct incorporation into the client device.

As we explore the WAP transaction model, shown in Figure 8.4, you will find that it is fundamentally the same as the Web transaction model in Figure 8.3. But with a few key differences.

The most significant difference is the need for what is called a gateway between the client and the web server, which contains the information you are interested in accessing. The gateways duties include the translation of WAP formatted messages received from the WAP server responds, it will most likely send a file containing WML and WML Script, the WAP equivalents of HTML and Java Script. It is the gateways job to change that next
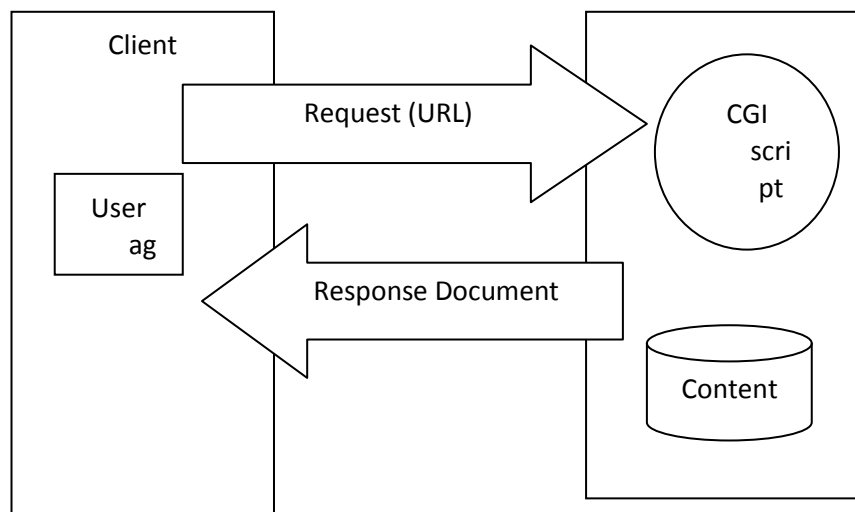
Fig. 8.3 The WW transaction model
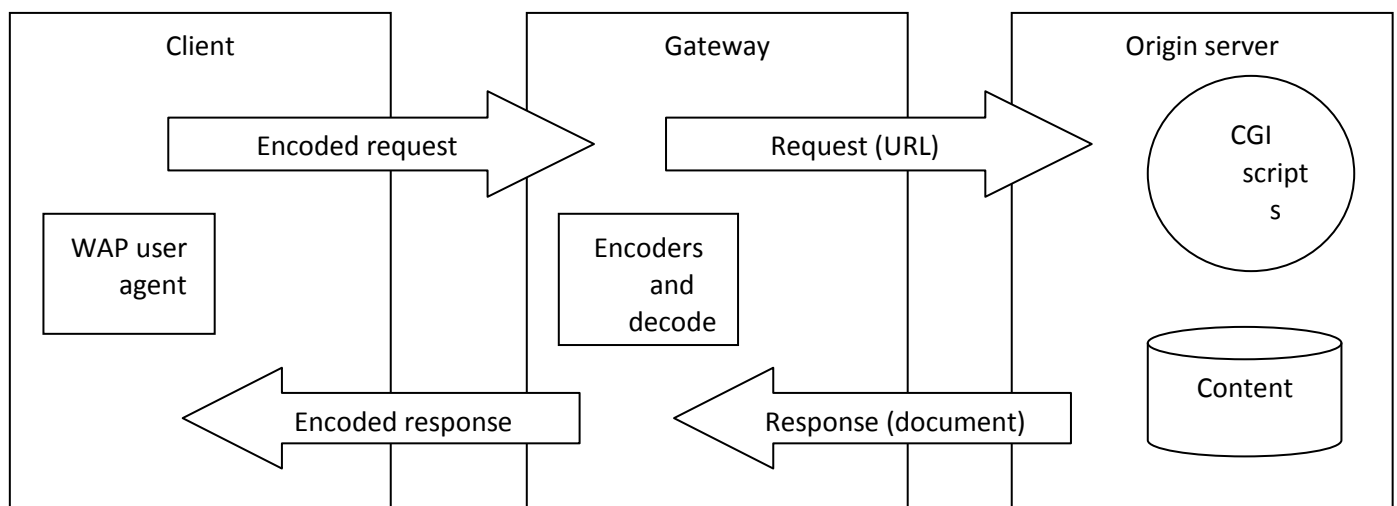
Fig. 8.4The WAP transaction model

File into a WAP binary file and encrypt it. A file in this format is more suitable for wireless transmission to the device that requested the information.

The gateway is also responsible for knowing the character sets and languages of the WAP devices that use it. Whether it is an English WAP device talking to German Web server or a Japanese WAP device requesting information from a French Web server, the gateway needs to ensure that the requester receives a coherent message.
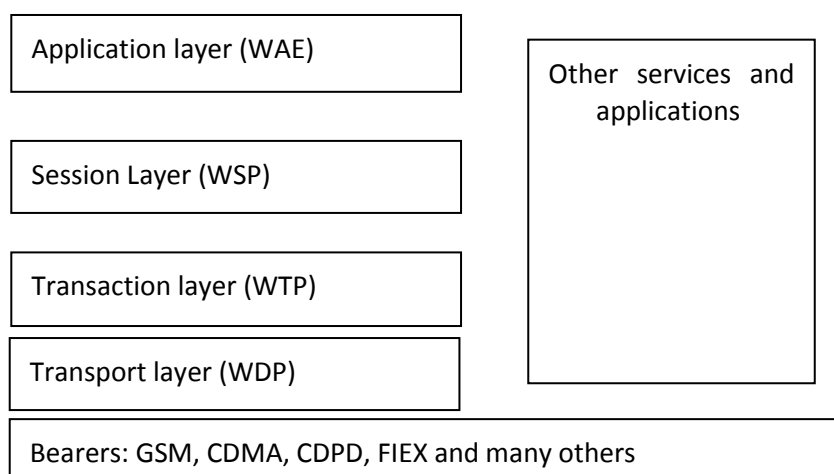
WAP Step – by –Step

Let us walk through a typical WAP transaction. So as to understand the steps involved in retrieving information from the Web server.

- A user requests a URL by entering into a WAP device (Alternately, an already-running WAP program requests a URL on behalf of the user.)
- The WAP device encodes the request into an encrypted. Compact binary format suitable for transmission over a wireless link and sends it to the WAP gateway.
- When wmlserver.com receives the request, it fulfils it by returning the requested documents back to the gateway.
- The gateway converts the HTTP response back into an encrypted binary format and ships it off to the WAP device.
- The WAP device decodes the response and displays the results on the WAP device's screen.

As you can observe, there are some similarities between the Web and the WAP transactions. For instance, they both use a request-response process, whereby the browser initiates the process. They both also use Web servers to deliver the requested content. These similarities let companies with investments in Web technology and resources leverage that knowledge to design WAP based systems.

WAP Architecture:

Figure 10.5 shows the Wireless Application Protocol in a series of layers. This layered format mimics the International Standards Organization (ISO) Open systems Interconnection (OSI) network model. The OSI Model defines a layered framework for generically describing and designing protocols. The OSI model has seven layers. WAP device start at the application layer.

```
┌────────────────────────────┐   ┌────────────────────┐
│ Application layer (WAE)     │   │ Other services and │
└────────────────────────────┘   │    applications    │
                                 │                    │
┌────────────────────────────┐   │                    │
│ Session Layer (WSP)         │   │                    │
└────────────────────────────┘   │                    │
                                 │                    │
┌────────────────────────────┐   │                    │
│ Transaction layer (WTP)     │   │                    │
└────────────────────────────┘   │                    │
┌────────────────────────────┐   │                    │
│ Transport layer (WDP)       │   │                    │
└────────────────────────────┘   └────────────────────┘
┌──────────────────────────────────────────────────┐
│ Bearers: GSM, CDMA, CDPD, FIEX and many others    │
└──────────────────────────────────────────────────┘
```

Fig. 8.5 the WAP architecture

And get processed until the request goes out over a bearer network to the gateway Responses enter the device at bearer level, and are transformed and finally displayed at the applications layers.

WAP request from an application must be transformed into a certain format before being sent wirelessly to a gateway and finally off to a web server to have the request fulfilled. The response on the return trip is unencrypted and decoded before being displayed on the screen each request and response must precede through the set of layers in Figure 8.5 in the correct order each and every time. With all these in mind. Let us analyze the WAP architecture layers.

WAP Application Environment (WAE)

The Wireless Application Environment layer is the one you are most likely concerned with if you are considering deploying WAP applications. It encompasses the devices, the content- development languages you use (WML and WML Script) the telephony APIs (WTA) for accessing telephony functionality from within WAE programs, and some well- defined content formats for phone book records, calendar information, and graphics.

Wireless Session Protocol (WSP)

WSP layer provides a consistent interface to WAE for two types of session services: a connection mode, and a connectionless service. Without getting bogged down into the details. It is important to note the services this layer enables, such as the following:

- Creating and releasing a connection between the client and server.
- Exchanging data between the client and server using a coding scheme that is much more compact than traditional HTML text.
- Suspending and releasing sessions between the client and server.

Wireless Transaction Protocol (WTP)

Now we are getting a bit more technical. WTP provides transaction services to WAP; it handles acknowledgements so that you can tell if a transaction succeeded. It also provides retransmission of transactions in case they are not successfully received, and removes duplicate transactions.

WTP manages different classes of transactions for WAP devices; unreliable one-way requests, reliable one-way requests, and reliable two-way requests. A reliable request means that acknowledge are sent from the receiving device. An unreliable requests from a makes it to the server. You might think that this is a ludicrous transaction type. Why would anyone request something, but not care if it was actually fulfilled? One-way paging networks work is in this fashion. If you page someone and the pager is off or out of range, that person does not receive the message. Since these commands are routed back to the home mobile network's Home Location Register (HLR), services based on USSD work just as well and in exactly the same way when users are roaming. USSD works on all existing GSM mobile phones. Both SIM Application Toolkit and the WAP, support USSD, USSD stage has been incorporated into the GSM standard. While USSD was previously a one-way bearer useful for administrative purposes such as service access, Stage 2 is more advanced and interactive. By sending in a USSD2 command, the user

can receive an information services menu. As such, USSD Stage2 provides WAP-Like features on existing phones.

USSD strings are typically too complicated for the user to remember. Involving the use of the * and # charters to denote the start and finish of the USSD string. However, USSD strings for regularly used services can be stored in the phone book, reducing the need to remember and re-enter them. As such, USSD could be ideal bearer for WAP on GSM networks.

General Packet Radio Service (GPRS)

GPRS is a new packet-based bearer that has been introduced on many GSM and Time Division Multiple Access (TDMA) Mobile networks from the year 2000 onwards. It is an exciting new bearer because it is immediate (there is no dial-up connection), relatively fast (up to 177.2 Kbps in the very best theoretical extreme), and supports virtual connectivity. Allowing relevant information to be sent from the network as and when it is generated.

There are two efficient means of proactively sending ("pushing") content to a mobile phone; by the Short Message service, which is of course one of WAP bearers; or by the user maintaining more or less a permanent GPRS (mobile originated) session with the content server. However, mobile terminated IP traffic might allow unsolicited information to reach the terminal Internet sources originating such unsolicited content may not be chargeable. A possible worst case scenario would be that mobile users would have to pay for receiving unsolicited junk content. This is a potential reason for mobile vendors to not support GPRS Mobile Terminate in their GPRS terminals. However, by originating the session themselves from their handset, users confirm their agreement to pay for the delivery of content from that service. Users could make their requests via a WAP session, which would not therefore need to be blocked. As such, a WAP session initiated from the WAP micro-browser will be the only way that GPRS users can receive information onto their mobile terminals. Since all but the early WAP-enabled phones will also support the General Packet Radio Service, WAP and GPRS could well be synergistic and be used together widely. For the kinds of interactive, menu-based information exchanges that WAP anticipates, CSD is not immediate enough because of the need to set up a call. Early prototypes of WAP services based on CSD were therefore close to unusable. SMS on the other band. Is immediate but is always stored and forwarded, such that even when a subscriber has just requested information from their micro-browser, the SMS Centre resources are used in the information transfer. As such, GPRS and WAP are ideal bearers for each other.

Additionally, WAP incorporates two different connection anodes WSP connection mode, or WSP connectionless protocol. This is very similar to be two GPRS Point-to Point services – connection oriented, and not connection- oriented. The predominant bearer for WAP- based services will depend on delays in the availability of WAP handsets and delays in the availability of GPRS terminals.

Applications

WAP is being used to develop enhanced forms of existing applications and new versions of today's applications. Existing mobile data software and hardware supplies are adding WAP support to their offering, either by developing their own WAP interface or more usually, partnering with one of the WAP Gateway suppliers profiled above. Previously, application developers wrote proprietary software applications and had to port that application to different network types and bearers within the same platform. By separating the bearer from the application, WAP facilitates easy migration of applications between networks and bearers. As such, WAP is similar to Java in that, it simplifies application development. This reduces the cost of wireless application development and therefore, encourages entry to the mobile industry by software developers.

WAP Programming Model

Pull Architecture

Push and Pull are two ways of transferring information to and from a phone, via WAP. Pulling occurs when the sure opens an Internet connection and initiates a request through the phone. Push does not require the use to initiate the request instead a third-party application begins the information transfer. Whether the user is the one to open the Interned connection or not, depends on the network being used. Figure 10.6 illustrates a simple pull transaction and the steps involved in it.

Step 1 :- The client (1) marks a request to a URL through his or her device.
Step 2:- The URL request is encoded and sent over the airwaves through a wireless protocol (2)
Step 3:- The URL is received by the WAP gateway (3) and is decoded.
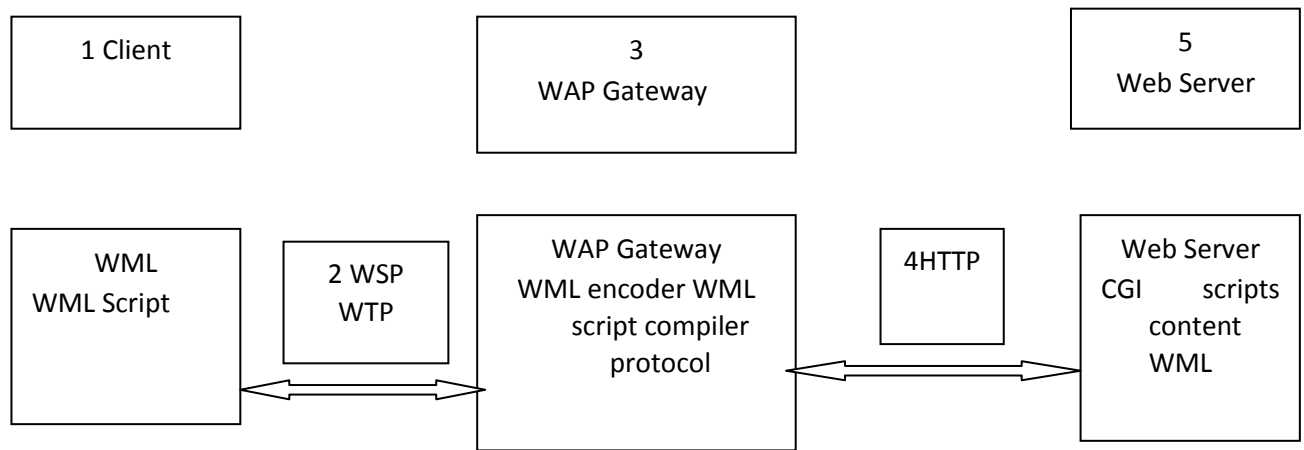Step 4:- The info is transferred to a web server via a normal HTTP request (4)
Step 5:- The Web server (5) retrieves an answer to the request using CGI scripts, ASP, or WML script. Calls to databases or other websites might be made to retrieve the Answer.
Step 6:- A WML or HDML packet is sent back to the gateway via HTTP.
Step 7:- The packet is encoded once more and sent back to the client via wireless protocol.
Step 8:- The phone interprets the packet and displays the response on its display screen.

1 Client		3 WAP Gateway		5 Web Server
WML WML Script	2 WSP WTP	WAP Gateway WML encoder WML script compiler protocol	4HTTP	Web Server CGI scripts content WML

Fig. 8.6 Pull architecture

Micro-browser

We have already discussed what the general duties of a micro-browser are. Like a regular Web browser, it submits requests for information, receives results, and interprets and displays those results on screen. There are also some secondary tasks associated with the job of a micro-browser.

The micro-browser includes both WML and WML Script interpreters. As the phone receives binary information in this format, the micro-browser interprets that data decides how to display and execute WML Script.

Though not specified in the WAP specification, the micro-browser may have additional capabilities. For example, the phone may include RAM for caching information in the same way computer hard drives cache information for regular Web browsers. If so, the micro-browser will have the software that helps it decide when a page should be cached, how long the information in the cache is valid, and when to remove items from the cache

The micro-browser is also responsible for understanding the HTTP I.I. protocol. As already described, the gateway is responsible for much of the translation between the WAP and HTTP protocols, However, when a request is sent from a WAP device, the micro-browser must be able to include valid HTTP information in the request so that the Web server knows how to interpret the request.

Finally, the micro-browser needs to know how to manage the limited resources of the WAP device. These devices are limited in screen size, processing power, RAM, ROM, and input/output capabilities. The micro-browser is responsible for juggling the demands of this limited environment.

WML

WML is similar to HTML. However, WML borrows heavily from the constructs of the Extensible Markup Language (XML) the Internet successor to HTML. The creators of WML accounted for the limited resources of WAP devices. However, they kept the tag-based design of HTML and in some areas, built more robust features into WML than those provided by HTML.

To see what we are talking about, look at the following snippet of HTML;

```
<Html>
<Head>
<Title> Empyrean Design Works</title></head>
<Body>
<Hl> Welcome </hl>
<p> Empyrean Design works is a firm for mobile, wireless
Full service software design and strategy, and handheld technologies.
<Html>
```

Now, here is an example of WML code.

```
<Wml>
<card id= "first" title = "Empyrean Design Works">
<p> Empyrean Design Works is a full service software design and strategy from for mobile, wireless, and handheld technologies </p>
</card>
</wml>
```

While the two pieces of code do not look identical, notice the similarities between HTML and WML Instead of starting and ending the document with < html > and < / html >, a WML document uses < wml > and < /wml > . Also notice that <p > is used in both languages as a way to mark a new paragraph within the document.

Both WML and HTML render similarly in their respective browsers. WAP browsers are just much more screen size challenged.

WML as a language has the following general features.

Support for text and images. This includes presentation hints like line breaks, formatting (bold, italic, and emphasis) and other placement clues. Not all devices support all text styles. WAP- compliant devices are not required to support images (this should change over time as devices become more capable), although the protocol does support them.

Support for user input.WML includes text entry fields, choice lists, and controls that invoke tasks. For instance, you can assign a URL to a specific button on a device such that when the user presses the button, a request is sent for a new document. The WAP specification has no specific definitions on how user input is accomplished. For example, if a WML program includes a list of options, the user may have to make their choice by pressing hardware buttons, tapping an on-screen button, or using voice input. It is up to each device manufacturer to determine how an options list is implemented.

A variety of navigation mechanisms. Based on the Internet-standard URL naming scheme, WAP lets you move between documents. Each WAP device may also incorporate a history mechanism for documents already visited, so that the user can revisit a previous document just by pressing a Back button, much like revisiting a previous page in a web browser.

Support for multiple languages and dialects. WML provides support for multiple languages and dialects by using the 16-bit Unicode character set.

State and context management features.   State management implies that variable values can be passed from document to document.   Additional capabilities include variable substitution and caching of variables and documents to maximize cache hits on the device and minimize wireless server requests.

WML Script

WML Script adds a lightweight procedural scripting language to each WAP device. Loosely based on JavaScript, WML Script lets programmers add intelligence to WAP programs. And reduces the necessity for requesting information from the Web server.
Programmers can use WML Script for the following:

Input validation. As users enter data like their name, a dollar amount, or a phone number, WML Script can validate the input against some template. For example, it can check that the dollar amount entered is under $100 and includes two digits after the decimal.

User interaction. WML Script lets an application interact with a user without constantly needing to contact a Web server for more documents, For instance, the If…… then ………else capability lets the program logic decide which document to show next or display an error message of some sort without first going over the network.
WML Script also includes libraries that provide a wide range of functionality, including math calculations, string processing, and URL manipulation, for instance.

Wireless Telephony Application Interface (WTAI)

WTAI is designed to let network operators access the telephony features of a WAP device. They can do such things as initiate phone calls using WML and WML Script accept incoming calls, hang up calls, send and receive text messages and manipulate phone book entries on the device. Besides those functions that are common to all WAP devices, WTAI supports telephony extensions that are specific to certain wireless telephone networks like GSM and Personal communication Services (PCS).
WAP is a feature-rich application environment. It programmability and telephony features make it very suitable for creating mobile applications. Its compact form. Encryption and error-handling make WAP suitable for the challenges of wireless transactions.
WAP will undoubtedly continue to evolve to support advanced features and functionality that will appear in smart phones in the near future.

Wireless Technologies

AMPS and European Analog Cellular

Advanced Mobile Phone Service or AMPS, is the analog cellular transport used throughout North America and in other parts of the world, notably Central and South America, New Zealand, and Australia. It has the best coverage of all North American Systems.
AMPS operate at 800 MHz It is a voice-only analog transport. You can also use it with a cellular modem for circuit-switched data communications. AMPS are slowly being

replaced with various competing digital networks. For the foreseeable future however, it will be the most readily available cellular network in North America.

At the same time AMPS systems were being built in the United States, a variety of incompatible analog systems were when being promoted in Europe and the rest of the world. Although they all operated in the 900 MHz frequency range, the European systems did not work well with each other. These 900 MHz European analog systems, which we do not identify individually, are rapidly being phased out in favor of all-digital systems.

TDMA

Time Division Multiple Access (TDMA) is a digital transport that divides the frequency range allotted to it into a series of channels. Each channel is then divided into time slots. Each conversation within that channel gets a time slot hence the term "division" in the name.

TDMA has been in use for quite some time in Europe as the basis for the GSM (Global System for Mobile Communications. More recently, it is being adopted in North America, in some PCS systems.

It is possible to overlay TDMA on top of an AMPS transport, converting an analog network to a hybrid analog/digital network. Some AMPS carriers in North America have been doing this to add security, capacity, and data capabilities to their older voice systems. This type of network has several names, such as Digital AMPS (D-AMPS) and North American TDMA (NA-TDMA)

CDMA

Code Division multiple Access (CDMA) is a digital transport that has been in use by the US military since the 1940s. However, as a commercial wireless transport, it is the new kid on the block compared to TDMA and AMPS.

Pioneered by US-based QUALCOMM a CDMA transmitter assigns a unique code to each wireless connection and then broadcasts its data out on the channel simultaneously with all other connections. The receiver is able to decode each conversation by knowing the unique code assigned to each connection.

CDMA is offer described as a party in a room where everyone speaks a different language. If everyone speaks at approximately the same volume, you should be able to hear all the conversations. If you know the unique code (language) used by each speaker, you can hear and understand all the conversations.

CDMA advocates the claim that it has some definite advantages over TDMA. First and foremost, CDMA enables simultaneous usage: approximately 10-20 times AMPS, and three times TDMA. It uses less power, giving you much better phone battery life. It is also more secure, because it hops from one frequency to another during a conversation, making it less prone to eavesdropping and phone fraud. Other benefits include fewer dropped calls and better voice quality.

CDMA is being widely deployed in North America in new PCS systems, but less widely throughout the world. Like TDMA, it can also be overlaid on top of AMPS systems to create hybrid analog/digital networks.

GSM

In the late 1980s, noting the wide disparity of analog cellular systems in Europe, various European political, trade, and academic interests started collaborating on an all-digital cellular communications network, Eventually called GSM, it has gone on to be the most widely deployed digital network in the world to date. It is used by millions of people in more than 200 countries.

Using an all-digital, TDMA-based network, every GSM phone has access to a variety of data functions at speed limited to 9600 bps (the effective throughput is typically about half that speed). These services include direct-connect Internet access (both circuit-switched and packet data) without requiring a modem, mobile fax capabilities, and short message service.

GSM started operating in the 900 MHz frequency range in all European countries. Additional networks are being deployed in the 1800 MHz frequency range. An alternate name for GSM in PCN (personal Communication Network) the European equivalent of PCS (Personal Communication Services.

CDPD

Cellular Digital Packet Data of CDPD is a TCP/IP based mobile data-only service that runs on AMPS networks. Since CDPD runs on analog networks, it requires a modem to convert friendly networks offer analog voice, circuit-switched data (made possible by the modem), and packet data service.

CDPD has a raw throughput of 19,200 bps. Unfortunately, the TCP/IP protocol consumes about half of that, giving you an effective data throughput of about 9,600 bps. CDPD is designed for relatively quick set-up and tear down, making it similar to packet data connections. However, it is not as efficient as digital-only networks for short, burst data communications.

CDPD is a uniquely North American protocol that is not widely used elsewhere in the world in fact; it has not been widely deployed in the US. CDPD will most likely be replaced by various all- digital networks in the coming years.

Voice/ Data Networks

Table 10.3 lists each of the major cellular voice communications networks that also support data. The table lists alternate names, the type of technology (analog, digital, or hybrid) the frequency range used by the network, and the part of the world where it's predominant.

Note that the locations are either US or Europe, which indicate that most of these networks are most popular in either the United States or Europe. However, they also enjoy some degree of success in other parts of the world. This is indicated by the word "global" in the location column.

TABLE 8.3
VOICE/DATA NETWORKS

Network names	Classification	Frequency	Location
AMPS	Analog	800 MHz	US/global
AMPS/CDPD	Analog	800 MHz	US
CEMA	Analog/ digital	800 MHz	Us/global
IDEN	Analog/digital	800 MHz	Us
TDM/D-AMPS/NA-TDMA	Analog/digital	800 MHz	Us/global
GSM/GSM900	digital	900 MHz	Europe/global
GSM/GSM1800/PCN	digital	1800 MHz	Europe/global
CDMA/PCS/PCS/1900	digital	1900 MHz	US
TDMA/PCS/PCS/1900	digital	1900 MHz	US
GSM-NA/GSM 1900/PCS 1900	digital	1900 MHz	US

Note that the locations are either US or Europe, which indicate that most of these networks are most popular in either the United States or Europe. However, they also enjoy some degree of success in other parts of the world. This is indicated by the word "global" in the location column.

A network is a unique combination of a spectrum block, a transport, and a protocol, Different networks offer have multiple common names and transport, and protocol names are often used interchangeably. This can make things a bit confusing.

All of these networks support circuit-switched data connections. You can use circuit-switched connections to access WAP data, but it's very inefficient. All of these networks, except for pure AMPS, support packet data connections or SMS, both of which can be used for WAP.

In spite of the fact that the cellular communications landscape is currently a mess, particularly in North America, proponents of the various networks are hard at work on two more generations of their respective technologies, insuring that things will get even more chaotic. What is being promised is an increase in speed. By 2005, speeds should reach up to 2 Mbps (million bits per second) letting us do such things as quickly send photographs from digital cameras to our friends and family, and receive real-time video using portable wireless devices.

Like the current state of affairs, there are several high-speed wireless data technologies with names such as GPRS, CDMA2000, and EDGE that are being touted as the next have of wireless data. Several of these systems are currently being tested in limited trials in various parts of the world. This means that the current confusing wireless communications landscape will get even more complicated as current technologies are replaced by their younger siblings. In general, data speeds will get faster. Data connections with cell phones (or data-only devices like two-way pagers) should also get easier and less expensive. That is great news for WAP.

In stark contrast to other technologies and markets, these companies created the WAP Forum to share information and to create an open standard. Each of the companies independently recognized the imminent convergence of voice and data communications. Due to this openness WAP has escaped the tragic end that other technologies often encounter as companies and alliances struggle to establish their standard. Additionally, this openness has fostered a rapid adoption rate by the majority of handheld paging and cellular phone companies.

Question Bank

Q.1 what do you mean by mobile commerce.
Q.2 Explain about WAP origin.
Q.3 Explain applications of mobile commerce
Q.4 Explain wireless technologies for mobile commerce.
Q.5 what are technologies used in Mobile Commerce?
Q.6 Write notes on secure messaging in e-commerce.
Q.7 Write a short note on Wireless Application Programming Model
Q.8 Write down the concept of WAP Model.
Q.9 Explain the basic concept of wireless technology.
Q.10 Describe the metrics for the design model of a WAP.
Q.11 Write a short note on GPRS (General Packet Radio Service)
Q.12 Write a short note on WDP (Wireless Datagram Protocol)
Q.13 Write a short note on SMS (short message service)
Q.14 Write a short note on USSD (unstructured supplementary services data)
Q.15 Write a short note on CDC (circuit switched data)
Q.16 Explain mobile web payments (WAP)
Q.17 Write a short note on: Mobile Wallets
Q.18 define cellular network.
Q.19 Explain different types of mobile payment methods
Q.20 explain challenges/ security issues to cellular technology in India
Q.21 explain broadcast messaging and paging in cellular networks.
Q.22 Write a short note on direct mobile billing payment method.
Q.23 Write a short note on SMS/USSD based mobile payment method.
Q.24 Write a short note on Direct Operator Billing mobile payment method.
Q.25 Explain micro-browser.
Q.26 Explain different generations of wireless communication.
Q.27 Explain WAP Architecture.
Q.28 Define Web Applications. Give suitable examples