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Introduction to E-Commerce

The term "**Electronic commerce**" (or *e-Commerce*) refers to the use of an electronic medium to carry out commercial transactions. Most of the time, it refers to the sale of products via Internet, but the term *eCommerce* also covers purchasing mechanisms via Internet (for B-To-B).

A client who purchases on the Internet is called a **cyberconsumer**. *E-Commerce* is not only limited to online sales, but also covers:
- Preparation of estimates online
- Consulting of users
- Provision of an electronic catalog
- Access plan to point of sales
- Real-time management of product availability (stock)
- Online payment
- Delivery tracking
- After-sales service

In certain cases, electronic commerce makes it possible to highly customize products, in particular when the electronic commerce site is linked with the production system of the enterprise (e.g. business cards, customized items such as T-shirts, cups, caps, etc.)

Finally, insofar as electronic services and products are concerned (MP3 files, software programs, e-books, etc.), electronic commerce makes it possible to receive the purchase in a very short time, if not immediately.

Electronic commerce (e-commerce) remains a relatively new, emerging and constantly changing area of business management and information technology. E-commerce is digitally enabled commercial transactions between and among organizations and individuals. *Digitally enabled transactions* include all transactions mediated by digital technology e.g. Internet. For the most part, this means transactions that occur over the Internet and the Web. *Commercial transactions* involve the exchange of value (e.g., money) across organizational or individual boundaries in return for products and services. Exchange of value is important for understanding the limits of e-commerce. Without an exchange of value, no commerce occurs.

Some of the definitions of e-commerce often heard and found in publications and the media are:

- Electronic Commerce (EC) is where business transactions take place via telecommunications networks, especially the Internet.
- Electronic commerce describes the buying and selling of products, services, and information via computer networks including the Internet.
- Electronic commerce is about doing business electronically.
- E-commerce is defined as the conduct of a financial transaction by electronic means.

1.1 Comparison between E-Commerce and traditional Commerce

Traditional Commerce or Commerce is a part of business, which encompasses all those activities that facilitate exchange. Two kinds of activities are included in commerce, i.e. trade and auxiliaries to trade. The term trade refers to the buying and selling of goods and services for cash or kind and auxiliaries to trade, implies all those activities like banking, insurance, transportation, advertisement, insurance, packaging, and so on, that helps in the successful completion of exchange between parties.

In finer terms, commerce encompasses all those activities that simplify the exchange of goods and services, from manufacturer to the final consumer. When the goods are produced, it does not reach to the customer directly rather it has to pass from various activities, which are included under commerce. Its main function is to satisfy the wants of consumers by making goods available to them, at the right time and place.

Electronic commerce is very much like traditional commerce. It also involves an exchange of goods. But the exchange of goods is conducted online. Technologies such as email, electronic data interchange and electronic fund transfer are used to track transactions and receive payments. Some of the differences between electronic commerce and traditional commerce are explained briefly below:

Difference between E-Commerce and Traditional Commerce

1. Cost effective
E-commerce is very cost effective when compared to traditional commerce. In traditional commerce, cost has to be incurred for the role of middlemen to sell the company's product. The cost incurred on middlemen is eliminated in e-commerce as there is a direct link between the business and the customer. The total overhead cost required to run e-business is comparatively less, compared to traditional business.

For example, in running an e-business, only a head office is required. Whereas in traditional method, a head office with several branches are required to cater to the needs of customers situated in different places. The cost incurred on labour, maintenance, office rent can be substituted by hosting a website in e-business method.

2. Time saving
It takes a lot of time to complete a transaction in traditional commerce. E-commerce saves a lot of valuable time for both the consumers and business. A product can be ordered and the transaction can be completed in few minutes through internet.

3. Convenience
E-commerce provides convenience to both the customers and the business. Customers can browse through a whole directories of catalogues, compare prices between products and

choose a desired product anytime and anywhere in the world without any necessity to move away from their home or work place.

E-commerce provides better connectivity for its prospective and potential customers as the organization's website can be accessed virtually from anywhere, any time through internet. It is not necessary to move away from their work place or home to locate and purchase a desired product.

4. Geographical accessibility
In traditional commerce, it may be easy to expand the size of the market from regional to national level. Business organizations have to incur a lot of expenses on investment to enter international market. In e-commerce it is easy to expand the size of the market from regional to international level.

By hosting a website, by placing advertisements on the internet and satisfying certain legal norms, a business can penetrate into global market. It is quite easy to attract customers from global markets at a marginal cost.

5. Introduction of new products
In traditional commerce, it takes a lot of time and money to introduce a new product and analyze the response of the customers. Initially, cost has to be incurred to carry out pilot surveys to understand the taste of the customers.

In e-commerce, it is easy to introduce a product on the website and get the immediate feedback of the customers. Based on the response, the products can be redefined and modified for a successful launch.

6. Profit
E-commerce helps to increase the sales of the organization. It helps the organization to enjoy greater profits by increasing sales, cutting cost and streamlining operating processes.

The cost incurred on the middlemen, overhead, inventory and limited sales pulls down the profit of the organization in traditional commerce.

7. Physical inspection
E-commerce does not allow physical inspection of goods. In purchasing goods in e-commerce, customers have to rely on electronic images whereas in traditional commerce, it is possible to physically inspect the goods before the purchase.

8. Time accessibility
Business is open only for a limited time in traditional commerce. Round the clock (24 x 7) service is available in e-commerce.

9. Product suitability
E-commerce is not suitable for perishable goods and high valuable items such as jewellery and antiques. It is mostly suitable for purchasing tickets, books, music and software. Traditional commerce is suitable for perishables and touch and feel items. Purchasing software, music in traditional commerce may appear expensive,

10. Human resource
To operate in electronic environment, an organization requires technically qualified staff with an aptitude to update them in the ever changing world. E-business has difficulty in recruiting and retaining talented people.

Traditional commerce does not have such problems associated with human resource in non electronic environment.

11. Customer interaction
In traditional commerce, the interaction between the business and the consumer is a "face-to-face".

In electronic commerce, the interaction between the business and the consumer is "screen-to-face". Since there is no personal touch in e-business, companies need to have intimate relationship with customers to win over their loyalty.

12. Process
There is an automated processing of business transactions in electronic commerce. It helps to minimize the clerical errors.

There is manual processing of business transactions in traditional commerce. There are chances of clerical errors to occur as human intervention takes place.

13. Business relationship
The business relationship in traditional commerce is vertical or linear, whereas in electronic commerce the business relationship is characterized by end-to-end.

14. Fraud
Lots of cyber frauds take place in electronic commerce transactions. People generally fear to give credit card information. Lack of physical presence in markets and unclear legal issues give loopholes for frauds to take place in e-business transactions.

Fraud in traditional commerce is comparatively less as there is personal interaction between the buyer and the seller.

Comparison Chart

BASIS FOR COMPARISON	TRADITIONAL COMMERCE	E-COMMERCE
Meaning	Traditional commerce is a branch of business which focuses on the exchange of products and services, and includes all those activities which encourages exchange, in some way or the other.	e-Commerce means carrying out commercial transactions or exchange of information, electronically on the internet.
Processing of Transactions	Manual	Automatic
Accessibility	Limited Time	24×7×365

BASIS FOR COMPARISON	TRADITIONAL COMMERCE	E-COMMERCE
Physical inspection	Goods can be inspected physically before purchase.	Goods cannot be inspected physically before purchase.
Customer interaction	Face-to-face	Screen-to-face
Scope of business	Limited to particular area.	Worldwide reach
Information exchange	No uniform platform for exchange of information.	Provides a uniform platform for information exchange.
Resource focus	Supply side	Demand side
Business Relationship	Linear	End-to-end
Marketing	One way marketing	One-to-one marketing
Payment	Cash, cheque, credit card, etc.	Credit card, fund transfer etc.
Delivery of goods	Instantly	Takes time

1.2 Elements of E-Commerce application
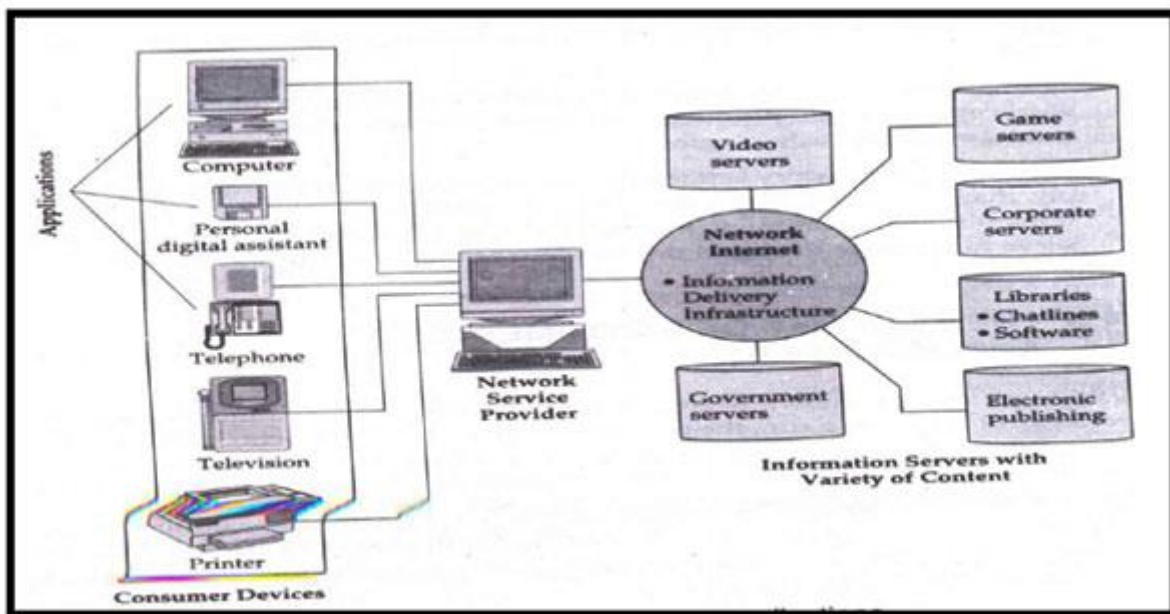
E-commerce Framework:

Generic Framework of Electronic Commerce

Electronic Commerce Applications

Public policy, legal, economical development, and privacy issues	Supply Chain Management Procurement & Purchasing Audio and Video on Demand Entertainment and Gaming	Online Marketing and Advertising Online Shopping Online Financial Transaction Education and Research	Technical standards for electronic documents, multimedia contents, business transactions, and network protocols
	Common Business Services Infrastructure (Security/Authentication, Electronic Payment, Directories/Catalogs)		
	Multimedia Content & Network Publishing Infrastructure (Digital Video, Electronic Books, World Wide Web)		
	Messaging & Information Distribution Infrastructure (EDI, E-Mail, HyperText Transfer Protocol)		
	Information Superhighway Infrastructure (Telecom, Cable TV, Wireless, Internet)		

1.3 Advantages and disadvantages of E-Commerce

BENEFITS OF E-COMMERCE

The benefits of e-commerce can be seen to affect three major stakeholders: organizations, consumers and society.

1) **Benefits of e-commerce to organizations**

i) *International marketplace.* What used to be a single physical marketplace located in a geographical area has now become a borderless marketplace including national and international markets. By becoming e-commerce enabled, businesses now have access to people all around the world.

ii) *Operational cost savings.* The cost of creating, processing, distributing, storing and retrieving paper-based information has decreased.

iii) *Mass customization.* E-commerce has revolutionized the way consumers buy well and services. In the past when Ford first started making motor cars, customers could have any color so long as it was black. Now customers can configure a car according to their specifications within minutes on-line via the www.ford.com website.

iv) *Enables reduced inventories* and overheads by facilitating 'pull'-type supply chain management – this is based on collecting the customer order and then delivering through JIT (just-in-time) manufacturing. This is particularly beneficial for companies in the high technology sector, where stocks of components held could

quickly become obsolete within months. For example, companies like Motorola (mobile phones), and Dell (computers) gather customer orders for a product, transmit them electronically to the manufacturing plant where they are manufactured according to the customer's specifications (like color and features) and then sent to the customer within a few days.

v) *Lower telecommunications cost.* The Internet is much cheaper than value added networks (VANs) which were based on leasing telephone lines for the sole use of the organization and its authorized partners. It is also cheaper to send a fax or e-mail via the Internet than direct dialing.

vi) *Digitization of products and processes.* Particularly in the case of software and music/video products, this can be downloaded or e-mailed directly to customers via the Internet in digital or electronic format.

vii) *No more 24-hour-time constraints.* Businesses can be contacted by or contact customers or suppliers at any time.

2) Benefits of e-commerce to consumers

i) *24/7 access.* Enables customers to shop or conduct other transactions 24 hours a day, all year round from almost any location. For example, checking balances, making payments, obtaining travel and other information.

ii) *More choices.* Customers not only have a whole range of products that they can choose from and customize, but also an international selection of suppliers.

iii) *Price comparisons.* Customers can 'shop' around the world and conduct comparisons either directly by visiting different sites. (For example www.moneyextra.co.uk for financial products and services).

iv) *Improved delivery processes.* This can range from the immediate delivery of digitized or electronic goods such as software or audio-visual files by downloading via the Internet, to the on-line tracking of the progress of packages being delivered by mail or courier.

v) *An environment of competition* where substantial discounts can be found or value added, as different retailers for customers.

3) Benefits of e-commerce to society

i) *Enables more flexible working practices,* which enhances the quality of life for a whole host of people in society, enabling them to work from home. It also potentially reduces environmental pollution as fewer people have to travel to work regularly.

ii) *Connects people.* Enables people in developing countries and rural areas to enjoy and access products, services, information and other people which otherwise would not be so easily available to them.

iii) Facilitates delivery of public services. For example, health services available over the Internet (on-line consultation with doctors or nurses), filing taxes over the Internet through the Inland Revenue website.

LIMITATIONS OF E-COMMERCE

There was much hype surrounding the Internet and e-commerce over the last few years of the twentieth century. Much of it promoted the Internet and e-commerce as the panacea for all ills, which raises the question, are there any limitations of e-commerce and the Internet?

Isaac Newton's 3rd Law of Motion, 'For every action there is an equal and opposite reaction' suggests that for all the benefits there are limitations to e-commerce. These again will be dealt with according to the three major stakeholders – organizations, consumers and society.

Limitations of e-commerce to organizations

i) *Lack of sufficient system security, reliability, standards and communication protocols.* There are numerous reports of websites and databases being hacked into, and security holes in software. For example, Microsoft has over the years issued many security notices and 'patches' for their software. Several banking and other business websites, including Barclays Bank, Powergen and even the Consumers' Association in the UK, have experienced breaches in security where 'a technical oversight' or 'a fault in its systems' led to confidential client information becoming available to all.

ii) *Rapidly evolving and changing technology,* so there is always a feeling of trying to 'catch up' and not be left behind.

iii) *Under pressure to innovate* and develop business models to exploit the new opportunities which sometimes leads to strategies detrimental to the organization. The ease with which business models can be copied and emulated over the Internet increases that pressure and curtails longer-term competitive advantage.

iv) *Facing increased competition* from both national and international competitors often leads to price wars and subsequent unsustainable losses for the organization.

v) *Problems with compatibility of older and 'newer' technology.* There are problems where older business systems cannot communicate with web based and Internet infrastructures, leading to some organizations running almost two independent systems where data cannot be shared. This often leads to having to invest in new systems or an infrastructure, which bridges the different systems. In both cases this is both financially costly as well as disruptive to the efficient running of organizations.

Limitations of e-commerce to consumers

i) *Computing equipment* is needed for individuals to participate in the new 'digital' economy, which means an initial capital cost to customers.

ii) *A basic technical knowledge* is required of both computing equipment and navigation of the Internet and the World Wide Web.

iii) *Cost of access to the Internet*, whether dial-up or broadband tariffs.

iv) *Cost of computing equipment.* Not just the initial cost of buying equipment but making sure that the technology is updated regularly to be compatible with the changing requirement of the Internet, websites and applications.

v) *Lack of security and privacy of personal data.* There is no real control of data that is collected over the Web or Internet. Data protection laws are not universal and so websites hosted in different countries may or may not have laws which protect privacy of personal data.

vi) *Physical contact and relationships are replaced by electronic processes.* Customers are unable to touch and feel goods being sold on-line or gauge voices and reactions of human beings.

vii) *A lack of trust because they are interacting with faceless computers.*

Limitations of e-commerce to society

i) *Breakdown in human interaction.* As people become more used to interacting electronically there could be erosion (divide) of personal and social skills which might eventually be detrimental to the world we live in where people are more comfortable interacting with a screen than face to face.

ii) *Social division.* There is a potential danger that there will be an increase in the social divide between technical haves and have-nots – so people who do not have technical skills become unable to secure better-paid jobs and could form an underclass with potentially dangerous implications for social stability.

iii) *Reliance on telecommunications infrastructure, power and IT skills,* which in developing countries nullifies the benefits when power, advanced telecommunications infrastructures and IT skills are unavailable or scarce or underdeveloped.

iv) *Wasted resources.* As new technology dates quickly how you do dispose of all the old computers, keyboards, monitors, speakers and other hardware or software?

v) *Facilitates Just-In-Time manufacturing.* This could potentially cripple an economy in times of crisis as stocks are kept to a minimum and delivery patterns are based on pre-set levels of stock which last for days rather than weeks.

vi) *Difficulty in policing the Internet,* which means that numerous crimes can be perpetrated and often go undetected. There is also an unpleasant rise in the availability and access of obscene material and ease with which pedophiles and others can entrap children by hidden in chat rooms.

1.4 Seven Unique Features of E-Commerce Technology

1. **Ubiquity:** In traditional commerce, a marketplace is restricted i.e. we can be in limited physical area to buy or sell. Whereas E-Commerce is ubiquitous meaning that it is available just about everywhere, at all times. It make possible to shop from your desktop, at home, at work or even from your car, using mobile commerce. The result is called a **market space** - a marketplace extended beyond traditional boundaries and removed from a temporal and geographic location. From a consumer perspective, ubiquity reduces transaction costs – the costs of participating in a market. To transact, it is no longer necessary that you spend time and money traveling to a market.

2. **Global Reach:** Unlike traditional commerce, e-commerce technology permits commercial transaction to cross cultural and national boundaries far more conveniently and cost effectively. As a result, the potential market size for e-commerce merchants is roughly equal to the size of the world's online population.

3. **Universal Standards:** One strikingly unusual feature of e-commerce technologies is that the technical standards of the Internet, and therefore the technical standards for conducting e-commerce, are universal standards – they are shared by all nation around the world. In contrast, most traditional commerce technologies differ from one nation to the next. For instance, television and radio standards differ around the world, as doe's cell telephone technology. The universal technical standards of e-commerce greatly lower market entry cost –t he cost merchants must pay just to bring their goods to market.

4. **Richness:** With the use of e-commerce technology merchant can present their message in effective way. Information richness refers to the complexity and content of the message.

5. **Interactivity:** E-Commerce technologies are interactive, meaning they allow two-way communication between merchant and consumer. Television, for instant, cannot ask the viewer any questions, enter into a conversation with a viewer, or request customer information be entered into a form. In contrast, all of these activities are possible on an e-commerce Web site. Interactivity allows an online merchant to engage a consumer in a ways similar to a face-to-face experience, but on a much more massive, global scale.

6. **Information density:** The Internet and the Web vastly increase information density – the total amount and quality of the information available to all market participants, consumers and merchants alike. E-commerce technologies reduce information collection, storage, and processing and communication costs. At the same time, these technologies increase greatly the accuracy and timeliness of information – making information more useful and important than ever. As a result, information becomes more plentiful, cheaper and of higher quality.

7. **Personalization/Customization:** E-commerce technologies permit **personalization**: Merchants can target their marketing message to specific individuals by adjusting the message. The technology also permits **customization** – changing the delivered product or service based on a user's preference or prior behavior.

UNIT-2

Business Model for Ecommerce

Introduction to Business Model

A business model is the methods of doing business by which a company can sustain itself, that is, generate revenue. The business model spells out how a company makes money by specifying where it is positioned in the value chain.

Some models are quite simple. A company produces goods or services and sells it to customers. If all goes well, the revenues from sales exceed the cost of operation and the company realizes profit. Other models can be more complex. Radio and television broadcasting is a good example. The broadcaster is part of a complex network of distributors, content creators, advertisers, and listeners or viewers. Who makes money and how much, It is not always clear at the outset. The bottom line depends on many competing factors.

For our understanding, e-commerce can be defined as any form of business transaction in which the parties interact electronically.' A transaction in an electronic market represents a number of interactions between parties. For instance, it could involve several trading steps, such as marketing, ordering, payment, and support for delivery. An electronic market allows the participating sellers and buyers to exchange goods and services with the aid of information technology. Electronic markets have three main functions such as:

    (i) matching buyers and sellers,
    (ii) facilitating commercial transactions, and
    (iii) providing legal infrastructure.

Information technology permeates all the three functions and also helps to increase market efficiency and reduce transaction costs.

The interaction between participants is supported by electronic trade processes that are basically search, valuation, payment and settlement, logistics, and authentication, as shown in Figure. The Internet and the World Wide Web allow companies to efficiently implement these key trading processes. For instance, many search services and brokers are available to help buyers find information, products, and merchants in electronic markets.
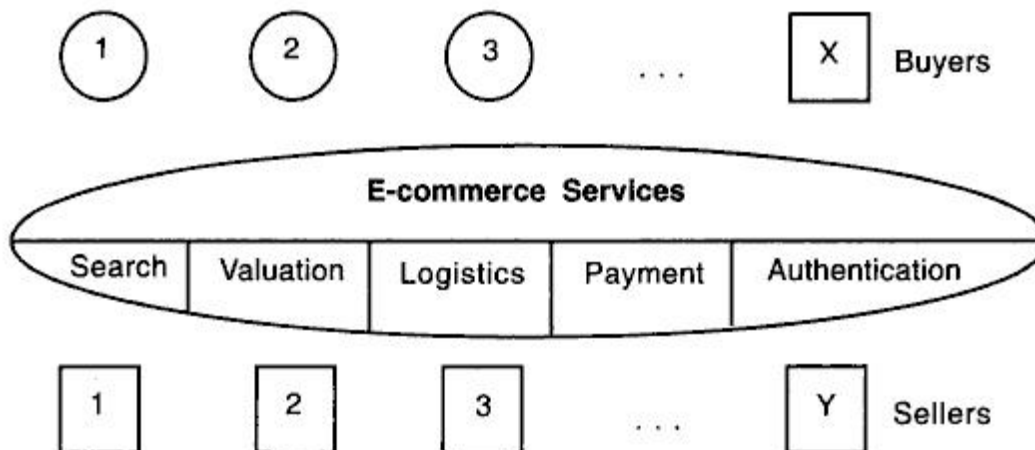
E-commerce can be formally defined as technology-mediated exchanges between parties (individuals, organizations, or both) as well as the electronically-based intra- or inter-organizational activities that facilitate such exchanges. It is global. It favors intangible things—ideas, information, and relationships. And it is intensely interlinked. These three attributes produce a new type of marketplace and society.

A company's business model is the way in which it conducts business in order to generate revenue. In the new economy, companies are creating new business models and reinventing old models. Reading the literature, we find business models categorized in different ways. Presently, there is no single, comprehensive and cogent taxonomy of Web business models that one can point to.

## 2.1 E-business model based on relationship of transaction parties:

2.1.1 Business-to- consumer,

The B2C model involves transactions between business organizations and consumers. It applies to any business organization that sells its products or services to consumers over the Internet. These sites display product information in an online catalog and store it in a database. The B2C model also includes services online banking, travel services, and health information and many more as shown in figure below.

Consumers are increasingly going online to shop for and purchase products, arrange financing, arrange 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 (or e-tail), and other online purchases such as airline tickets, entertainment venue tickets, hotel rooms, and shares of stock.

Some B2C e-businesses 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 ediels.com (nutritional counseling).

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

B2C Business Model
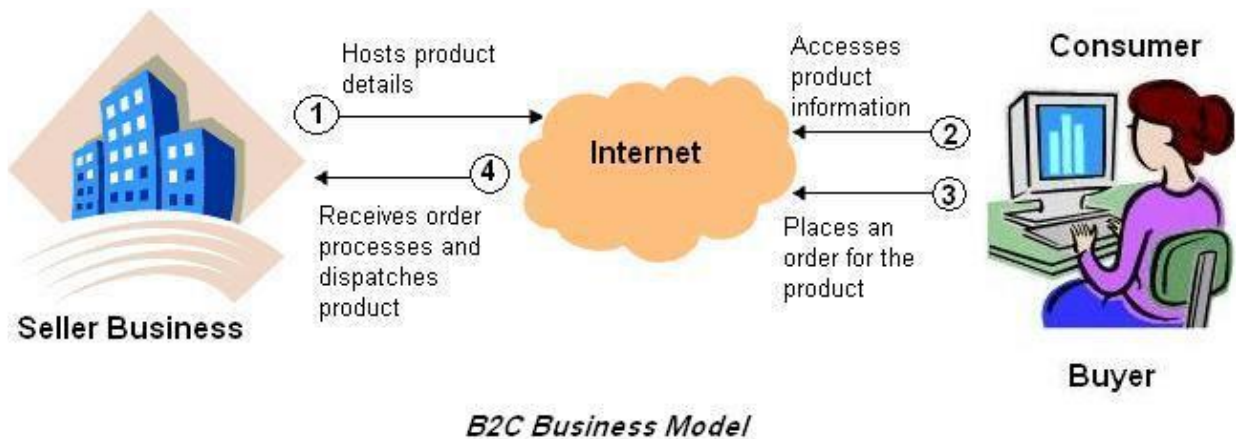
E-tailors that offer traditional or Web-specific products or services only over the Internet are sometimes called virtual merchants, and provide another variation on the B2C model. Examples of virtual merchants include amazon.com (books. electronics, toys, and music), eToys.com (children's books and 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 avan.com (cosmetics and fragrances), chefs (cookware and kitchen accessories), Omaha Steaks (premium steaks, meats, and other gourmet food), and Harry 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 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 means that the playing field has been leveled 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 interfaces facilitate 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.

Processes in B2C (How Does B2C Work?)

B2C e-commerce is more than just an online store. 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.
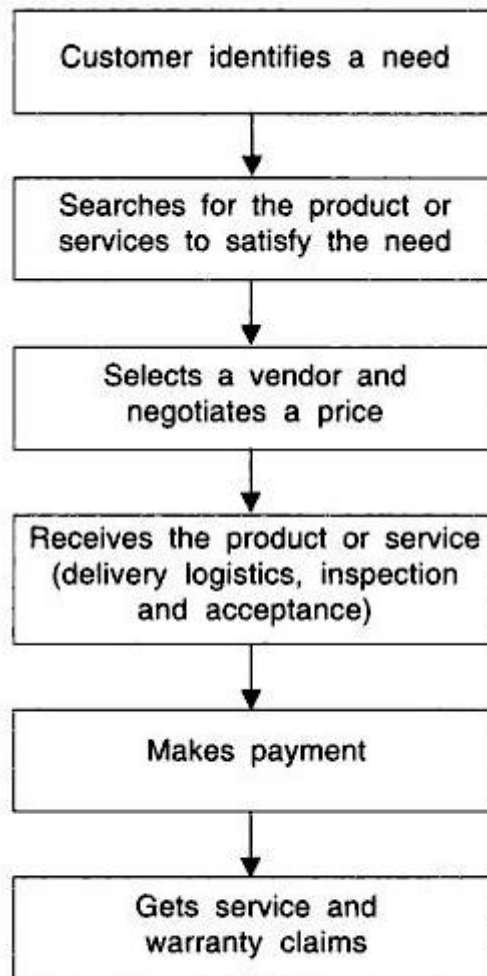
The B2C process is now explained in greater details:

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 right product becomes easy by using a keyword search engine. Virtual malls may include a basic to an advanced search engine, product rating system, content management, customer support systems, bulletin boards, newsletters 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 registry. 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 buys products**. Through a shopping cart system, order details, shipping charges, taxes, additional charges and price totals are presented in an organized manner. The customer can even change the quantity of a certain product. Virtual malls have a very comprehensive shopping system, complete with check-out forms.

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.

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 be incorporated even though it is an e-business. Getting the product to the customer is still the most important 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 fulfilled.

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 through customer relationship management or CRM.

The example of the www.amazon.com site also involves the B2C model in which the consumer searches for a book on their site and places an order, if required. This implies that a complete business solution might be an integration solution of more than one business model. For example, www.amazon.com includes the B2B model in which the publishers transact with Amazon and the B2C model in which an individual consumer transact with the business organization. The B2C model of e-commerce is more prone to the security threats because individual consumers provide their credit card and personal information n the site of a business organization. In addition, the consumer might doubt that his information is secured and used effectively by the business organization. This is the main reason why the B2C model is not very widely accepted. Therefore, it becomes very essential for the business organizations to provide robust security mechanisms that can guarantee a consumer for securing his/her information.

2.1.2 Business-to-Business,

The B2B model involves electronic transactions for ordering, purchasing, as well as other administrative tasks between business houses. It includes trading goods, such as business subscriptions, professional services, manufacturing, and wholesale dealings. Sometimes in the B2B model, business may exist between virtual companies, neither of which may have any physical existence. In such cases, business is conducted only through the Internet.

Let us look at the example of www.amazon.com. As you know, www.amazon.com is an online bookstore that sells books from various publishers including Wrox, O'Reilly, Premier Press, and so on. In this case, the publishers have the option of either developing their own site or displaying their books on the Amazon site (www.amazon.com), or both. The publishers mainly choose to display their books on www.amazon.com at it gives them a larger audience. Now, to do this, the publishers need to transact with Amazon, involving business houses on both the ends, is the B2B model as shown in figure below.

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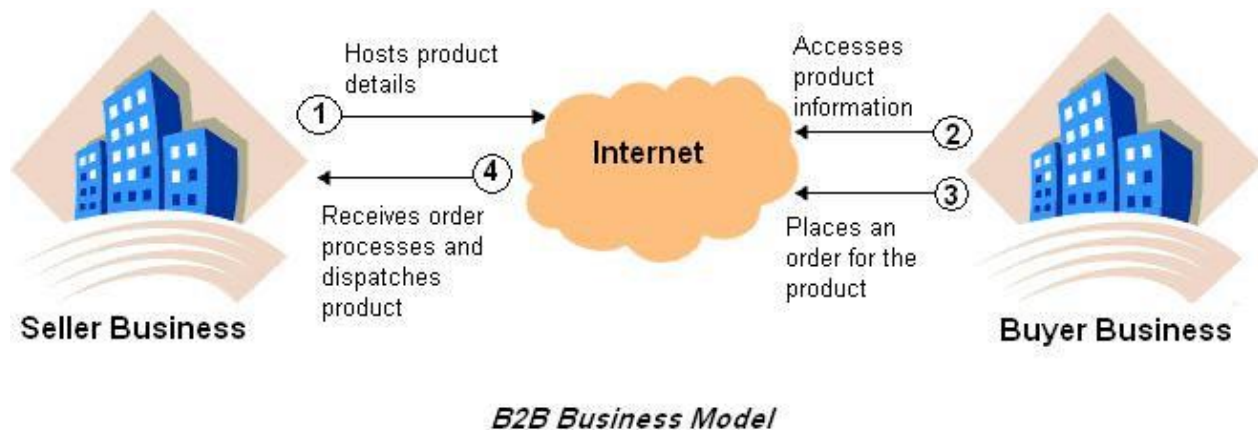
Thus, B2B is that model of e-commerce whereby a company conducts its trading and other commercial activity through the Internet and the customer is another business itself. This essentially means commercial activity between companies through the Internet as a medium.

This is supposed 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 requirements on the Web. Many B2B sites are company and industry specific, catering to a community of users, or are a combination of forward and backward integration. Companies have achieved huge savings in distribution-related costs due to their B2B applications.

Major Advantages of B2B
1) **Direct interaction with customers**. This is the greatest advantage of e-business.
2) **Focused sales promotion**. This information gives authentic data about the likes, dislikes and preferences of clients and thus helps the company bring out focused sales promotion drives which arc 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 found that once the customers develop a binding relationship with a site and its product, they do not like to shift loyalties 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.
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.

Processes for Business-to-Business Transactions and Models
B2B interactions involve much more complexity 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 transactions 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.

2.1.3 Consumer-to-Consumer,

The C2C model involves transaction between consumers. Here, a consumer sells directly to another consumer. eBay and www.bazee.com are common examples of online auction Web sites that provide a consumer to advertise and sell their products online to another consumer. However, it is essential that both the seller and the buyer must register with the auction site. While the seller needs to pay a fixed fee to the online auction house to sell their products, the buyer can bid without paying any fee. The site brings the buyer and seller together to conduct deals as shown in figure below.
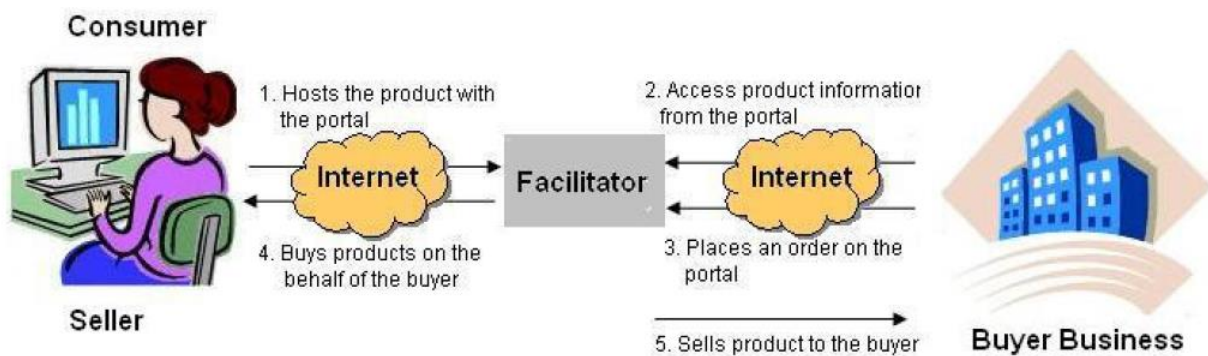

C2C Business Model
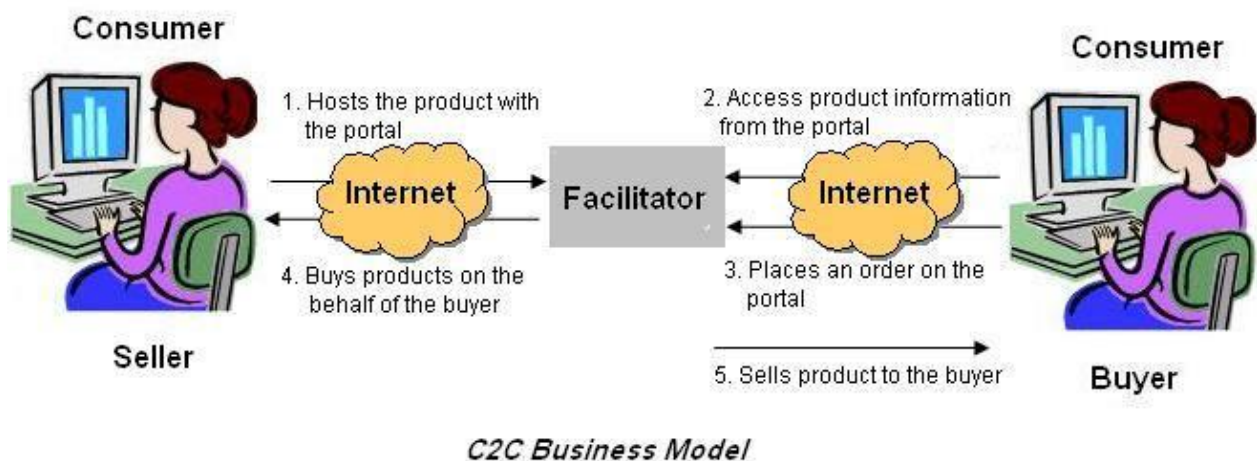
Let us now look at the previous figure with respect to eBay. When a customer plans to sell his products to other customers on the Web site of eBay, he first needs to interact with an eBay site, which in this case acts as a facilitator of the overall transaction. Then, the seller can host his product on www.ebay.com, which in turn charges him for this. Any buyer can now browse the site of eBay to search for the product he interested in. If the buyer comes across such a product, he places an order for the same on the Web site of eBay. eBay now purchase the product from the seller and then, sells it to the buyer. In this way, though the transaction is between two customers, an organization acts as an interface between the two organizations.

There are also a number of new consumer-to-consumer expert information exchanges that are expected to generate $6 billion in revenue by 2005. Some 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 the "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.

2.1.4 Consumer to Business

The C2B model involves a transaction that is conducted between a consumer and a business organization. It is similar to the B2C model, however, the difference is that in this case the consumer is the seller and the business organization is the buyer. In this kind of a transaction, the consumers decide the price of a particular product rather than the supplier. This category includes individuals who sell products and services to organizations. For example, www.monster.com is a Web site on which a consumer can post his bio-data for the services he can offer. Any business organization that is interested in deploying the services of the consumer can contact him and then employ him, if suitable as shown in figure.

C2B Business Model

Let us look at another example of the C2B model. William Ward needs to buy an airline ticket for his journey from New York to New Jersey. William needs to travel immediately. Therefore, he searches a Web site for a ticket. The Web site offers bidding facility to people who want to buy tickets immediately. On the Web site, William quotes the highest price and gets the ticket.

In addition to the models discussed so far, five new models are being worked on that involves transactions between the government and other entities, such as consumer, business organizations, and other governments. All these transactions that involve government as one entity are called e-governance. The various models in the e-governance scenario are:
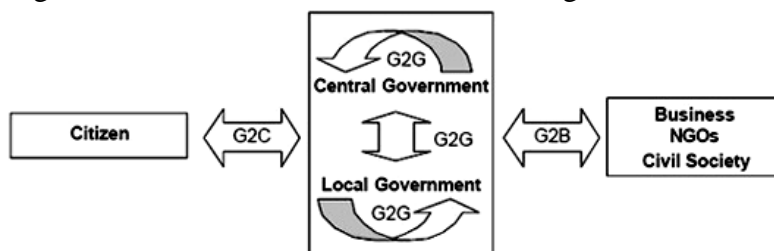
A.   **Government-to-Government (G2G) model**: This model involves transactions between 2 governments. For example, if the American government wants to by oil from the Arabian government, the transaction involved are categorized in the G2G model.

B.   **Government-to-Consumer (G2C) model**: In this model, the government transacts with an individual consumer. For example, a government can enforce laws pertaining to tax payments on individual consumers over the Internet by using the G2C model.

C.   **Consumer-to-Government (C2G) model**: In this model, an individual consumer interacts with the government. For example, a consumer can pay his income tax or house tax online. The transactions involved in this case are C2G transactions.

D.   **Government-to-Business (G2B) model**: This model involves transactions between a government and business organizations. For example, the government plans to build a fly over. For this, the government requests for tenders from various contractors. Government can do this over the Internet by using the G2B model.

E.   **Business-to-Government (B2G) model**: In this model, the business houses transact with the government over the Internet. For example, similar to an individual consumer, business houses can also pay their taxes on the Internet.

E-Business models based on the relationship of Transaction Types

Based on transaction type, different types of transactions can be identified as listed below:
- Brokerage
- Aggregator
- Info-mediary
- Community
- Value chain
- Advertising

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 strategy.

1) Brokerage Model

Brokers are market-makers: they bring buyers and sellers together and facilitate transactions. Brokers play a frequent role in business-to-business (B2B), business-to-consumer (B2C), or consumer-to-consumer (C2C) markets. Usually a broker charges a fee or commission for each transaction it enables. The formula for fees can vary depending on context. Brokerage models include:

Marketplace Exchange: offers a full range of services covering the transaction process, from market assessment to negotiation and fulfillment. Some examples are [Orbitz, ChemConnect]

Buy/Sell Fulfillment: takes customer orders to buy or sell a product or service, including terms like price and delivery. Some examples are [CarsDirect, Respond.com]

Auction Broker: conducts auctions for sellers (individuals or merchants). Broker charges the seller a listing fee and commission scaled with the value of the transaction. Auctions vary widely in terms of the offering and bidding rules. Some examples are [eBay]

Transaction Broker: provides a third-party payment mechanism for buyers and sellers to settle a transaction. Some examples are [PayPal, Escrow.com]

Search Agent: a software agent or "robot" used to search-out the price and availability for a good or service specified by the buyer, or to locate hard to find information.

Virtual Marketplace or virtual mall: a hosting service for online merchants that charges setup, monthly listing, and/or transaction fees. It may also provide automated transaction and relationship marketing services. Some examples are [zShops and Merchant Services at Amazon.com]

2) Aggregator Model

Electronic commerce business model where a firm (that does not produce or warehouses any item) collects (aggregates) information on goods and/or services from several competing sources at its website. The firm's strength lies in its ability to create an 'environment' which draws visitors to its website, and in designing a system which allows easy matching of prices and specifications. Aggregator model includes:

Virtual Merchant: this is a business that operate only from the web and offers either traditional or web specific goods and services. The method of selling may be listing price or auction. Some example includes [Amazon, eToys]

Catalog Merchant: Catalog business is a migration of mail order to web-based order business.

Bit Vendor: This is the merchant that deals strictly in digital products and services in its purest form.

Subscription model: The users have to pay for the access of the site. High value added content should be essential for subscription model. Some examples are [Wall street journal, Consumer Reports]

3) Info-mediary Model

Data about consumers and their consumption habits are valuable, especially when that information is carefully analyzed and used to target marketing campaigns. Independently collected data about producers and their products are useful to consumers when considering a purchase. Some firms function as infomediaries (information intermediaries) assisting buyers and/or sellers understand a given market. Info-mediary model includes:

Advertising Networks: feed banner ads to a network of member sites, thereby enabling advertisers to deploy large marketing campaigns. Ad networks collect data about web users that can be used to analyze marketing effectiveness. [DoubleClick]

Audience Measurement Services: online audience market research agencies. [Nielsen//Netratings]

Incentive Marketing: customer loyalty program that provides incentives to customers such

as redeemable points or coupons for making purchases from associated retailers. Data collected about users is sold for targeted advertising. [Coolsavings]

Metamediary: facilitates transactions between buyer and sellers by providing comprehensive information and ancillary services, without being involved in the actual exchange of goods or services between the parties. [Edmunds]

4) Community Model

The viability of the community model is based on user loyalty. Users have a high investment in both time and emotion. Revenue can be based on the sale of ancillary products and services or voluntary contributions; or revenue may be tied to contextual advertising and subscriptions for premium services. The Internet is inherently suited to community business models and today this is one of the more fertile areas of development, as seen in rise of social networking.

Open Source: software developed collaboratively by a global community of programmers who share code openly. Some examples are [Red Hat, Linux]

Open Content: openly accessible content developed collaboratively by a global community of contributors who work voluntarily. [Wikipedia]

Public Broadcasting: user-supported model used by not-for-profit radio and television broadcasting extended to the web. A community of users supports the site through voluntary donations. [The Classical Station (WCPE.org)]

Social Networking Services: sites that provide individuals with the ability to connect to other individuals along a defined common interest (professional, hobby, romance). Social networking services can provide opportunities for contextual advertising and subscriptions for premium services. [Facebook, Orkut]

5) Value Chain Model

Value chain selling is supported through two business models: demand chain and a supply chain; E-Commerce supports the transactions through both the demand chain business model and supply chain business model.

Products, goods, services, or information are delivered through the parties of the value chain from producers to end users. A value chain also has relationship and administrative aspects, that is, you can manage the relationship of the partners or enterprises in your value chain, as well as offer some administrative services to those parties.

As a result, value chain business models must manage the two sides of their businesses: their customers and direct sales, and their channel partners and suppliers. Each requires its own management channels and practices.

To sell directly to customers (direct sales), value chain models usually include a storefront, where customers can purchase their goods or services directly. To manage relationships with partners or suppliers, the demand chain and a supply chain models within the value chain include a hub.

6) Advertising Model

The web advertising model is an extension of the traditional media broadcast model. The broadcaster, in this case, <u>a web site</u>, provides content (usually, but not necessarily, for free) and services (like email, IM, blogs) mixed 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 advertising model works best when the volume of viewer traffic is large or highly specialized. Advertising model includes:

Portal: usually a search engine that may include varied content or services. A high volume of user traffic makes advertising profitable and permits further diversification of site services. Some common examples are [Google, Yahoo!]

Classifieds: list items for sale or wanted for purchase. Listing fees are common, but there also may be a membership fee. [Monster.com, Craigslist]

User Registration: content-based sites that are free to access but require users to register and provide demographic data. Registration allows inter-session tracking of user surfing habits and thereby generates data of potential value in targeted advertising campaigns. [NYTimes]

Contextual Advertising / Behavioral Marketing: For example, a browser extension that automates authentication and form fill-ins, also delivers advertising links or pop-ups as the user surfs the web. Contextual advertisers can sell targeted advertising based on an individual user's surfing activity.

Electronic Data Interchange (EDI)

UNIT-3

Introduction to Electronic Data Interchange (EDI)

As a cost-conscious, highly competitive electronic commerce environment comes of age, businesses are looking at **electronic data interchange (EDI)** in a new light. EDI is defined as the inter-process communication (computer application to computer application) of business information in a standardized electronic form. In short, EDI communicates information for business transactions between the computer systems of companies, government organizations, small businesses, and banks.

Using EDI, trading partners establish computer-to-computer links that enable them to exchange information electronically. This allows businesses to better cope with a growing avalanche (too many) of paperwork: purchase orders, invoices, confirmation notices, shipping receipts, and other documents. With the aid of EDI, all these documents are in electronic form, which aliases more work automation to occur and even alters the way business is done.

Many industries see EDI as essential for reducing cycle and order fulfillment times. Manufacturers work with customers and suppliers to convert to an electronic exchange the huge volume of orders and records that now crawl back and forth on paper. In retailing, EDI can provide vendors with a snapshot of what stores are selling, enabling them to recognize and meet their customer's needs much faster than in the past. In addition, it enables retailers and vendors to place orders and pay bills electronically, reducing time and the expense of paperwork.

The primary benefit of EDI to business is a considerable reduction in transaction costs, by improving the speed and efficiency of filling orders. Studies show that it takes up to five times as long to process a purchase order manually as it does electronically.

Ironically, despite these advantages, EDI is not (yet) widely used. It is estimated that out of millions of businesses in the United States, only 44,000 companies exchange business data electronically. Only about 10 percent of these companies use EDI for financial transactions. Moreover, no more than fifty banks have the capability of providing complete financial EDI services to their corporate customers. The joke in industry is that most companies are so unfamiliar with EDI they don't even know how to spell it.

Defining EDI: Because of the different approaches in the development and implementation of EDI, there is no one consensus on a definition of EDI. A review of some of the prevailing definitions follows:

Electronic data interchange is the transmission, in a standard syntax, of unambiguous information of business between computers of independent organizations. [The Accredited Standards Committee for EDI of the American National Standards Institute]

Electronic data interchange is the interchange of standard formatted data between computer application systems of trading partners with minimal manual intervention. [UN/EDIFACT Training Guide]

Electronic data interchange is the electronic transfer, from computer to computer, of commercial and administrative data using an agreed standard to structure an EDI message. [Article 2.1, of the European Model EDI agreement]

3.1 Basic components of EDI,

Electronic Data Interchange (EDI) has three major components. They are,
• Trading partners
• Translation software
• Communications

Trading partners: These are business organizations that agree to exchange business information, data and documents via EDI. Small, medium and large organizations that are involved in various types of business activities are part of this group. For partners that dare to trade options that are now being made available are endless.

Translation software: This software written in some of the most popular platforms regulates most of the operations. Some of its main features include,

1. It is dual purpose software and it converts files to or from an EDI format called a 'document'
2. A document is known as an EDI message and the definition specifies the content and sequence of the data to be included
3. In the case of outbound business information, data or documents (we will refer to as document), an internal application file format is translated into an EDI format
4. For inbound documents, the EDI format is translated into an EDI format
5. For inbound documents, the EDI format is retranslated into an internal application file format
6. It is not necessary for trading partners to use the same translation software, nor is it necessary for them to have similar hardware platforms
7. Software and hardware independence is one of the major advantages of EDI

Communications: The transmission and reception of 'document' between trading partners using compatible hardware and software, which best suits their requirements.
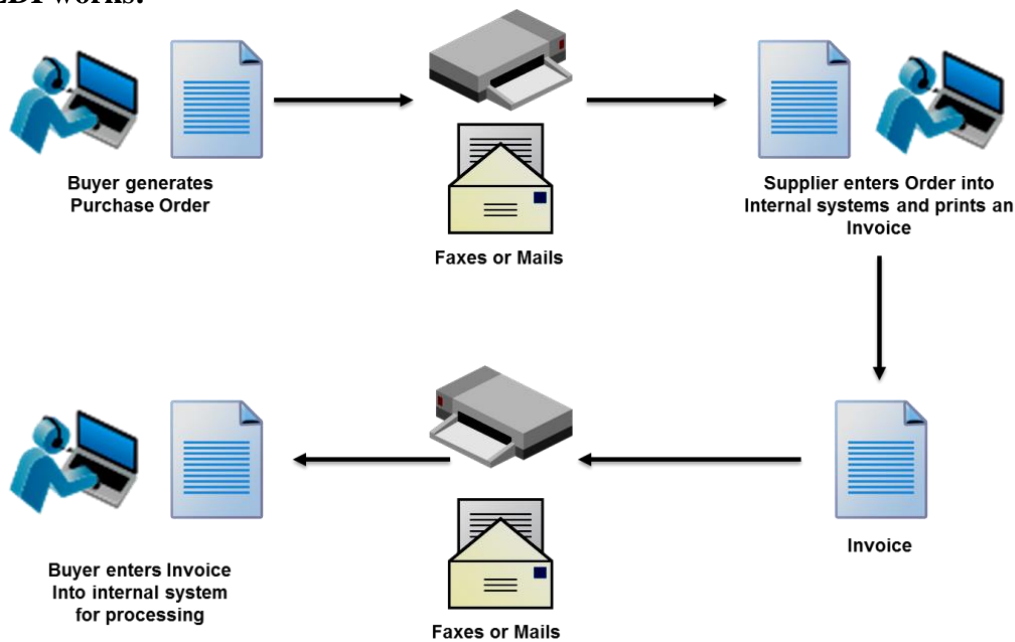
3.2 Comparison between EDI and E-mail,

EDI document transport is far more complex than simply sending e-mail messages or sharing files through a network. These EDI documents are more structured than e-mail. What really differentiates EDI from messaging is its emphasis on the automation of business transactions conducted between organizations. In addition, EDI messages have certain legal status. For instance, if a buyer sends a supplier EDI purchase orders that specify the requirements, time of delivery, and quantity and the supplier does not uphold its end of the contract, it can be taken to court with the EDI trading agreements serving as evidence. Table below indicates some EDI properties which distinguish it from e-mail.

Electronic Data Interchange (EDI)	Electronic Mail
There is typically no human involvement in the processing of the information, as the interface has software-to-software orientation. The data are structured in a software-understandable way.	The data are not necessarily structured to be software-understandable. A human-to-software interface is involved at a minimum of one end of the interchange.
The interchange is composed by one software for interpretation by another software. If a reply is involved, it is composed by a software to be interpreted by another software.	The message is composed by a human and/or interpreted by a human and/or a reply is composed by a human and/or interpreted by a human.

Table: EDI versus E-mails

How EDI works:

Buyer generates Purchase Order → Faxes or Mails → Supplier enters Order into Internal systems and prints an Invoice → Invoice → Faxes or Mails → Buyer enters Invoice Into internal system for processing

3.3 Benefits and drawbacks of EDI

Benefits of EDI

1) **Expedite transmission:** Information is transmitted from one organization to another organization efficiently and swiftly.

2) **Automated Data entry:** Data is entered automatically by EDI software. For instance, when purchase order (PO) from one company is received by another company. Sales order (SO) is automatically generated at other company's system with the help of EDI software.

3) **Receipt verification:** Receipt verification can easily be done with help of EDI software. No human intervention is involved so there are minimal chances of error or delay.

4) **Data Validation:** Data validation is automatically done.

5) **Availability of free software:** Free software are available depending upon the EDI format chosen. For example- In TRADACOMS EDI format, Price Information file and order files are available for free.

6) **Low cost:** Lower administrative, resource and maintenance cost.

7) **Faster processing** : With the help of EDI, business processes can be executed at a much faster rate as compared to the traditional method sending information.

8) **Building long-term relationships:** EDI helps in building long term relationships with trading partners and hence helps in business growth.

9) **Reduction in error:** EDI has discarded manual data entry and paperwork. So there are minimal chances of error.

Drawbacks of EDI
1) **Expensive**
Setup and maintenance of some of the formats of EDI is expensive.

2) **Initial setup is time consuming**
Initial cost to setup EDI is time consuming.

3) **EDI standard changes**
The business process depends on EDI standard format. If any of the standard format changes then the business process has to be changed accordingly.

4) **System electronic protection**
An EDI enabled system needs electronic protection from viruses, hacking, malware and other frauds.

5) **Staff training cost**
Staff needs training in order to run EDI enabled software. Investment has to be done in training.

6) **Proper backup** should be maintained as the whole data depends on EDI. In case of any crash of EDI system, proper backup has to be maintained and extra cost is required for it.

7) **Limit your trading partners**
Some organization stops doing business which don't use EDI. For instance, Wal-Mart prefers to do business only with those organization which uses EDI.

UNIT-4

Network security and Firewalls

Introduction to Network Security

A network security is defined as a circumstance, condition with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service, and/or fraud, waste, and abuse.

The discussion of security concerns in electronic commerce can be divided into two broad types:

1. Client/server security uses various authorization methods to make sure that only valid user and programs have access to information resources such as databases. Access control mechanisms must be set up to ensure that properly authenticated users are allowed access only to those resources that they are entitled to use. Such mechanisms include password protection, encrypted smart cards, biometrics, and firewalls.

2. Data and transaction security ensures the privacy and confidentiality in electronic messages and data packets, including the authentication of remote users in network transactions for activities such as on-line payments. The goal is to defeat any attempt to assume another identity while involved with electronic mail or other forms of data communication. Preventive measures include data encryption using various cryptographic methods.

4.1 Client server network security,

Client/server network security is one of the biggest headaches system administrators face as they balance the opposing goals of user maneuverability and easy access and site security and confidentiality of local information. According to the National Center for Computer Crime Data, computer security violations cost U.S. businesses half a billion dollars each year.

Network security on the Internet is a major concern for commercial organizations, especially top management. Recently, the Internet has raised many new security concerns. By connecting to the Internet, a local network organization may be exposing itself to the entire population on the Internet. As figure below illustrates, an Internet connection opens itself to access from other networks comprising the public Internet.
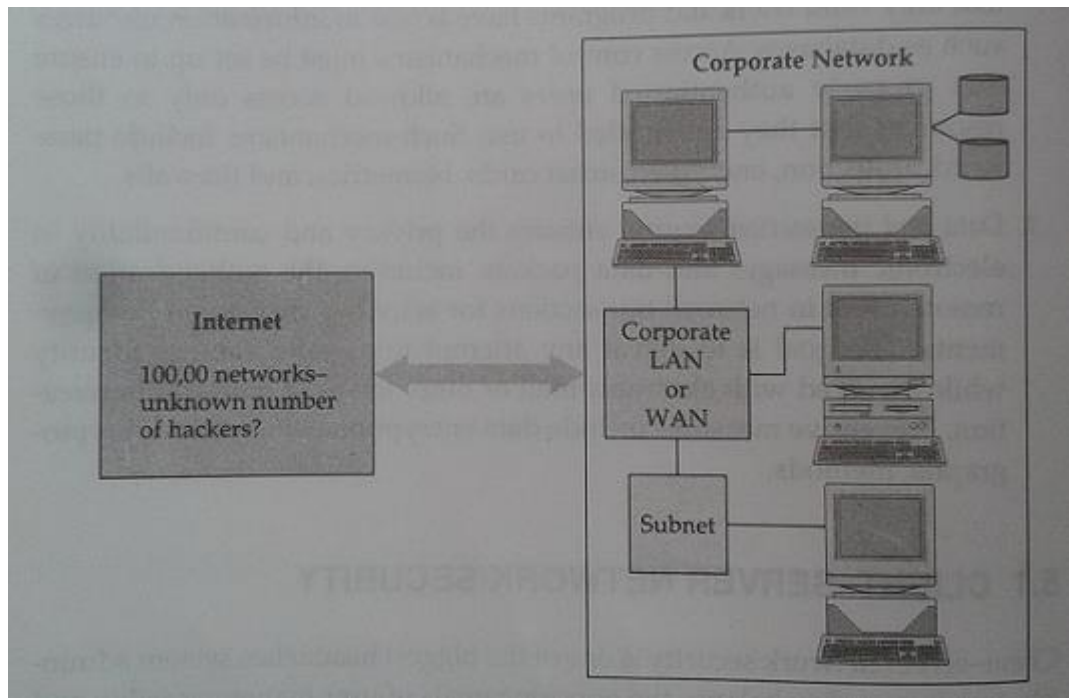
Fig: Unprotected Internet Connection

That being the case, the manager of even the most relaxed organization must pay some attention to security. For many commercial operations, security will simply be a matter of making sure that existing system features, such as passwords and privileges, are configured properly. They need to audit all access to the network. A system that records all log-on attempts—particularly the unsuccessful ones—can alert managers to the need for stronger measures. However, where secrets are at stake or where important corporate assets must be made available to remote users, additional measures must be taken. Hackers can use password guessing, password trapping, security holes in programs, or common network access procedures to impersonate users and thus pose a threat to the server.

Client–server network security problems manifest themselves in three ways:
1) **Physical security holes** result when individuals gain unauthorized physical access to a computer. A good example would be a public workstation room, where it would be easy for a wandering hacker to reboot a machine into single-user mode and tamper with the files, if precautions are not taken. On the network, this is also a common problem, as hackers gain access to network systems by guessing passwords of various users.

2) **Software security holes** result when badly written programs or "privileged" software are "compromised" into doing things they shouldn't. The most famous example of this category is the "send mail" hole, which brought the Internet to its knees in 1988. A more recent problem was the "rlogin" hole in the IBM RS-6000 workstations, which enabled a cracker (a malicious hacker) to create a "root" shell or super user access mode. This is the highest level of access possible and could be used to delete the entire file system, or create a new account or password file.

3) **Inconsistent usage holes** result when a system administrator assembles a combination of hardware and software such that the system is seriously flawed from a security point of view. The incompatibility of attempting two unconnected but useful

things creates the security hole. Problems like this are difficult to isolate once a system is set up and running, so it is better to carefully build the system with them in mind. This type of problem is becoming common as software becomes more complex.

To reduce these security threats, various protection methods are used. At the file level, operating systems typically offer mechanisms such as access control lists that specify the resources various users and groups are entitled to access. Protection—also called authorization or access control—grants privileges to the system or resource by checking user-specific information such as passwords. The problem in the case of e-commerce is very simple: If consumers connect a computer to the Internet, they can easily log into it from anywhere that the network reaches. That's the good news. The bad news is that without proper access control, anyone else can too.

Over the years, several protection methods have been developed, including trust-based security, security through obscurity, password schemes, and biometric systems.

Trust-Based Security: Quite simply, trust-based security means to trust everyone and do nothing extra for protection. It is possible not to provide access restrictions of any kind and to assume that all users are trustworthy and competent in their use of the shared network. This approach assumes that no one ever makes an expensive breach such as getting root access and deleting all files (a common hacker trick). This approach worked in the past, when the system administrator had to worry about a limited threat. Today, this is no longer the case.

Security through Obscurity: Most organizations in the mainframe era practiced a philosophy known as security through obscurity (STO)—the notion that any network can be secure as long as nobody outside its management group is allowed to find out anything about its operational details and users are provided information on a need-to-know basis. Hiding account passwords in binary files or scripts with the presumption that "nobody will ever find them" is a prime case of STO (somewhat like hiding the house key under the doormat and telling only family and friends). In short, STO provides a false sense of security in computing systems by hiding information.

Password Schemes: One straightforward security solution, a password scheme, erects a first-level barrier to accidental intrusion. In actuality, however, password schemes do little about deliberate attack, especially when common words or proper names are selected as passwords. For instance, network administrators at a Texas air force base discovered that they could crack about 70 percent of the passwords on their UNIX network with tools resembling those used by hackers. The simplest method used by most hackers is dictionary comparison—comparing a list of encrypted user passwords against a dictionary of encrypted common words EGCN941. This scheme often works because users tend to choose relatively simple or familiar words as passwords. To beat the dictionary comparison method, experts often recommend using a minimum of eight-character length mixed-case passwords containing at least one non- alphanumeric character and changing passwords every 60 to 90 days.

Biometric Systems: Biometric systems, the most secure level of authorization, involve some unique aspect of a person's body. Past biometric authentication was based on comparisons of fingerprints, palm prints, retinal patterns, or on signature verification or voice recognition. Biometric systems are very expensive to implement: At a cost of several thousand dollars per reader station, they may be better suited for controlling physical access—where one biometric unit can serve for many workers—than for network or workstation access. Many biometric devices also carry a high price in terms of inconvenience; for example, some

systems take 10 to 30 seconds to verify an access request.

4.2 Firewall and its types,

The most commonly accepted network protection is a barrier—a firewall between the corporate network and the outside world (untrusted network). The term firewall can mean many things to many people, but basically it is a method of placing a device—a computer or a router—between the network and the Internet to control and monitor all traffic between the outside world and the local network. Typically, the device allows insiders to have full access to services on the outside while granting access from the outside only selectively, based on log-on name, password, IP address or other identifiers as shown in figure below.
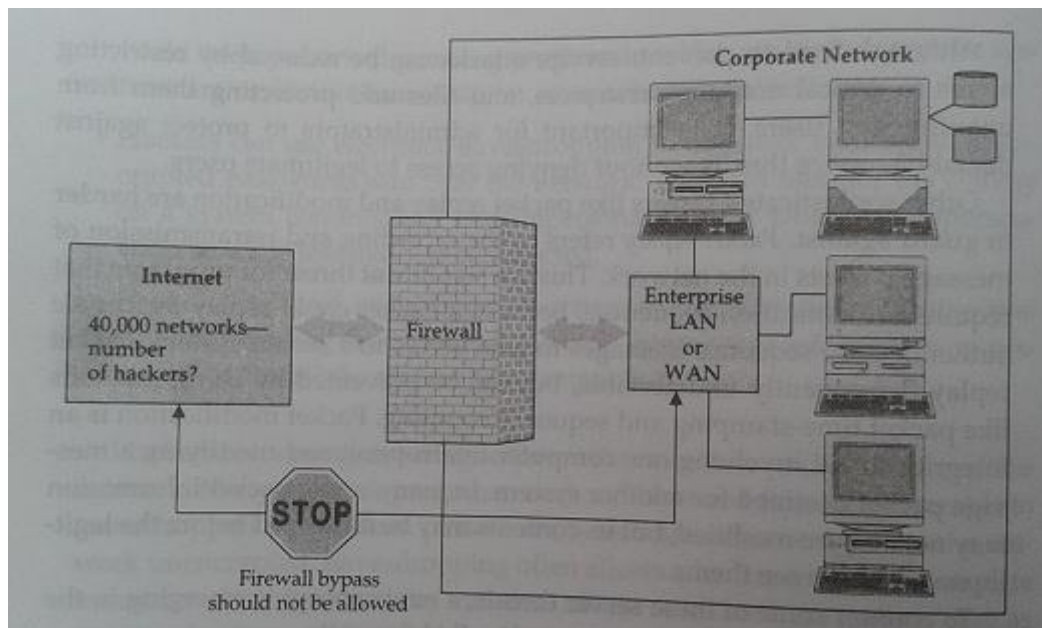

Fig: Firewall-secured Internet Connection

Generally speaking, a firewall is a protection device to shield vulnerable areas from some form of danger. In the context of the Internet, a firewall is a system—a router, a personal computer, a host, or a collection of hosts—set up specifically to shield a site or subnet from protocols and services that can be abused from hosts on the outside of the subnet. A firewall system is usually located at a gateway point, such as a site's connection to the Internet, but can be located at internal gateways to provide protection for smaller collection of hosts or subnets.

Firewalls come in several types and offer various levels of security. Generally, firewalls operate by screening packets and/or the applications that pass through them, provide controllable filtering of network traffic, allow restricted access to certain applications, and block access to everything else. The actual mechanism that accomplishes filtering varies widely, but in principle, the firewall can be thought of as a pair of mechanisms: one to block incoming traffic and the other to permit outgoing traffic. Some firewalls place a greater emphasis on blocking traffic, and others emphasize permitting traffic.

In short, the general reasoning behind firewall usage is that, without a firewall, network security is a function of each host on the network and all hosts must cooperate to achieve a uniformly high 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 can occur not as the result of complex attacks, but because of simple errors in configuration and inadequate passwords.

Types of Firewall (Firewalls in Practice)
Firewalls range from simple traffic logging systems that record all network traffic flowing through the firewall in a file or database for auditing purposes to more complex methods such as IP packet screening routers, hardened fire-wall hosts, and proxy application gateways. The simplest firewall is a packet- filtering gateway or screening router. Configured with filters to restrict packet traffic to designated addresses, screening routers also limit the types of services that can pass through them.

More complex and secure are application gateways. They are essentially PCs or UNIX boxes that sit between the Internet and a company's internal network to provide proxy services to users on either side. For example, a user who wants to FTP in or out through the gateway would connect to FTP software running on the firewall, which then connects to machines on the other side of the gateway. Screening routers and application gateway firewalls are frequently used in combination when security concerns are very high.

IP Packet Screening Routers: This is a static traffic routing service placed between the network service provider's router and the internal network. The traffic routing service may be implemented at an IP level via screening rules in a router or at an application level via proxy gateways and services. Figure below shows a secure firewall with an IP packet screening router.
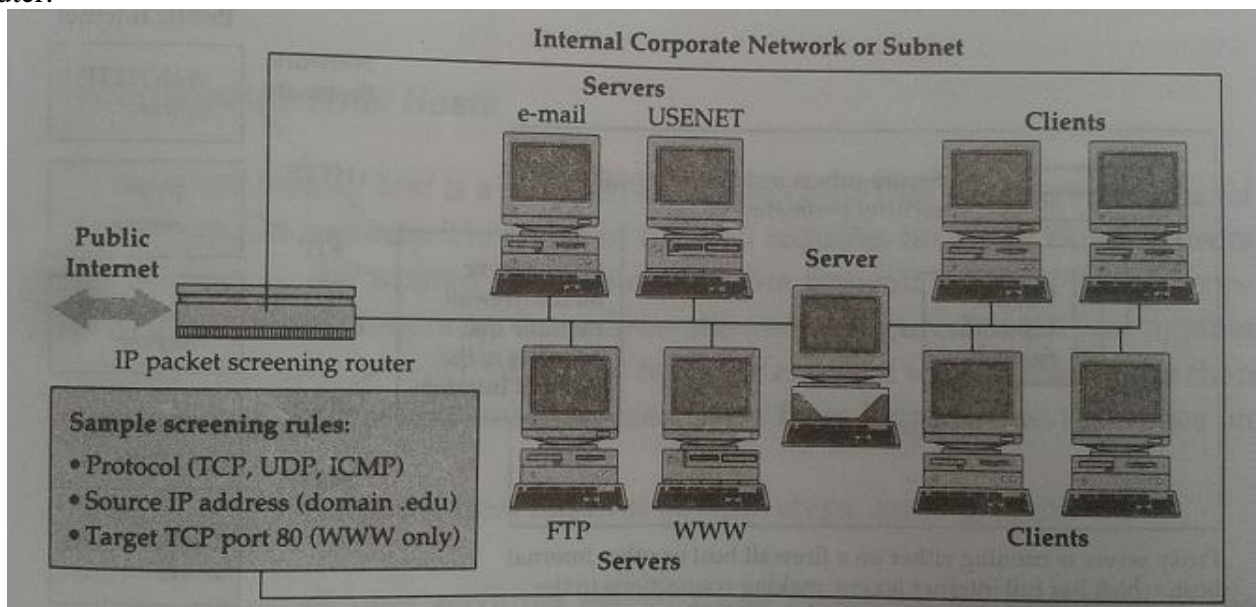

Fig: Secure firewall with IP packet screening router

The firewall router filters incoming packets to permit or deny IP packets based on several screening rules. These screening rules, implemented into the router are automatically performed. Rules include target interface to which the packet is routed, known source IP address, and incoming packet protocol (TCP, UDP, ICMP). ICMP stands for Internet Control Message Protocol, a network management tool of the TCP/IP protocol suite.

Although properly configured routers can plug many security holes, they do have several disadvantages. First, screening rules are difficult to specify, given the vastly diverse needs

of users. Second, screening routers are fairly inflexible and do not easily extend to deal with functionality different from that preprogrammed by the vendor. Lastly, if the screening router is circumvented by a hacker, the rest of the network is open to attack.

Proxy Application Gateways: A proxy application gateway is a special server that typically runs on a firewall machine. Their primary use is access to applications such as the World Wide Web from within a secure perimeter as shown in figure below. Instead of talking directly to external WWW servers, each request from the client would be routed to a proxy on the firewall that is defined by the user. The proxy knows how to get through the firewall. An application-Level proxy makes a firewall safely permeable for users in an organization, without creating a potential security hole through which hackers can get into corporate networks. The proxy waits for a request from inside the firewall, forwards the request to the remote server outside the firewall, reads the response, and then returns it to the client. In the usual case, all clients within a given subnet use the same proxy. This makes it possible for the proxy to execute efficient caching of documents that are requested by a number of clients. The proxy must be in a position to filter dangerous URLs and malformed commands.
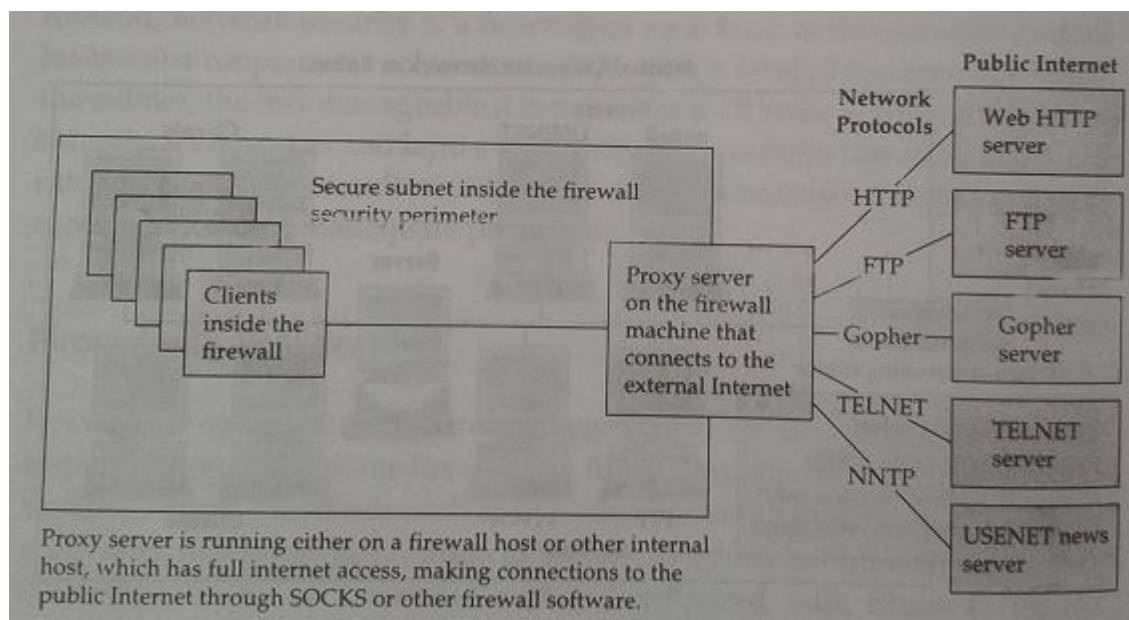

Fig: Proxy servers on the World Wide Web

Hardened Firewall Hosts: A hardened firewall host is a stripped-down machine that has been configured for increased security. This type of firewall requires inside or outside users to connect to the trusted applications on the firewall machine before connecting further. Generally, these firewalls are configured to protect against unauthenticated interactive log-ins from the external world. This, more than anything, helps prevent unauthorized users from logging into machines on the network.

The hardened firewall host method can provide a greater level of audit and security, in return for increased configuration cost and decreased 'level of service (because a proxy needs to be developed for each desired service).

4.3 Encryption and Decryption,

Encryption is the process of transforming information so it is unintelligible to anyone but the intended recipient. Decryption is the process of transforming encrypted information so that it

is intelligible again. A cryptographic algorithm, also called a cipher, is a mathematical function used for encryption or decryption. In most cases, two related functions are employed, one for encryption and the other for decryption.

With most modern cryptography, the ability to keep encrypted information secret is based not on the cryptographic algorithm, which is widely known, but on a number called a key that must be used with the algorithm to produce an encrypted result or to decrypt previously encrypted information. Decryption with the correct key is simple. Decryption without the correct key is very difficult, and in some cases impossible for all practical purposes.

4.4 Secret key Cryptography and public Key Cryptography,

The success or failure of an e-commerce operation depends on different key factors, including but not limited to the business model, the team, the customers, the investors, the product, and the security of data transmissions and storage. Data security has taken on heightened importance since a series of high-profile "cracker" attacks have humbled popular Web sites, resulted in the impersonation of Microsoft employees for the purposes of digital certification, and the misuse of credit card numbers of customers at business-to-consumer e-commerce destinations. Security is on the mind of every e-commerce entrepreneur who solicits, stores, or communicates any information that may be sensitive if lost. Technologists are building new security measures while others are working to crack the security systems. One of the most effective means of ensuring data security and integrity is **encryption**.

Encryption is a generic term that refers to the act of encoding data, in this context so that those data can be securely transmitted via the Internet. Encryption can protect the data at the simplest level by preventing other people from reading the data. In the event that someone intercepts a data transmission and manages to deceive any user identification scheme, the data that they see appears to be gibberish without a way to decode it. Encryption technologies can help in other ways as well, by establishing the identity of users (or abusers); control the unauthorized transmission or forwarding of data; verify the integrity of the data (i.e., that it has not been altered in any way); and ensure that users take responsibility for data that they have transmitted.

Encryption can therefore be used either to keep communications secret (defensively) or to identify people involved in communications (offensively). Encryption Provide Following Security:
- **Message Integrity**: provides assurance that the message has not been altered.
- **No repudiation**: prevents the users from denying he/she sent the message
- **Authentication**: provides verification of the identity of the person (or machine) sending the message.
- **Confidentiality**: give assurance that the message was not read by others.

There are two types of encryption: **symmetric key** encryption and **asymmetric key** encryption. Symmetric key and asymmetric key encryption are used, often in conjunction, to provide a variety of security functions for data and message security in e-commerce.

Symmetric Key Encryption (Private or Secret Key Encryption):

Encryption algorithms that use the same key for encrypting and for decrypting information are called symmetric-key algorithms. The symmetric key is also called a secret key because it

is kept as a shared secret between the sender and receiver of information. Otherwise, the confidentiality of the encrypted information is compromised. Figure below shows basic symmetric key encryption and decryption.
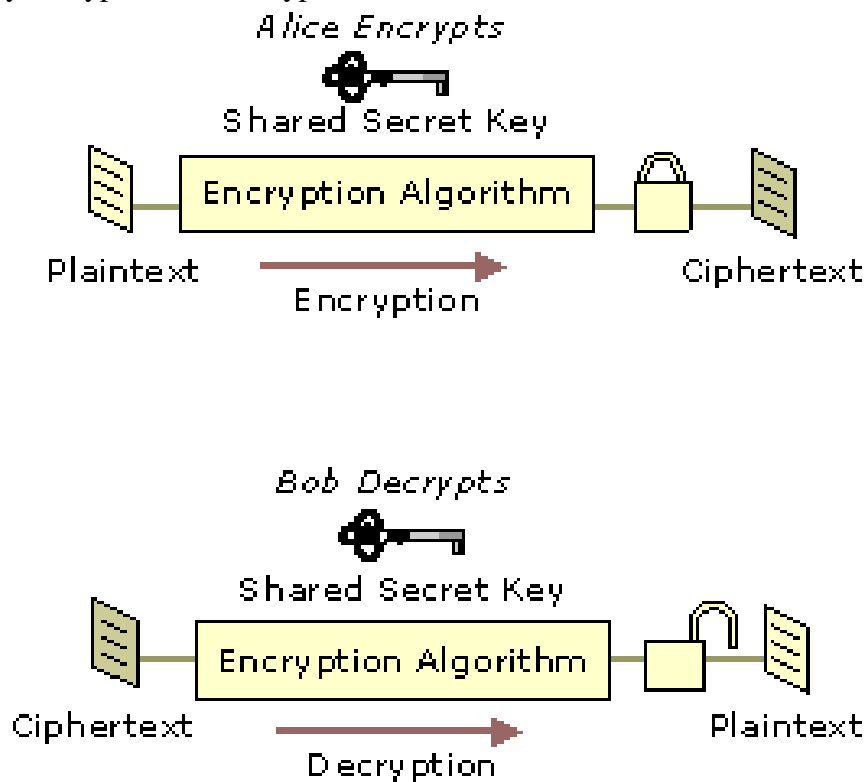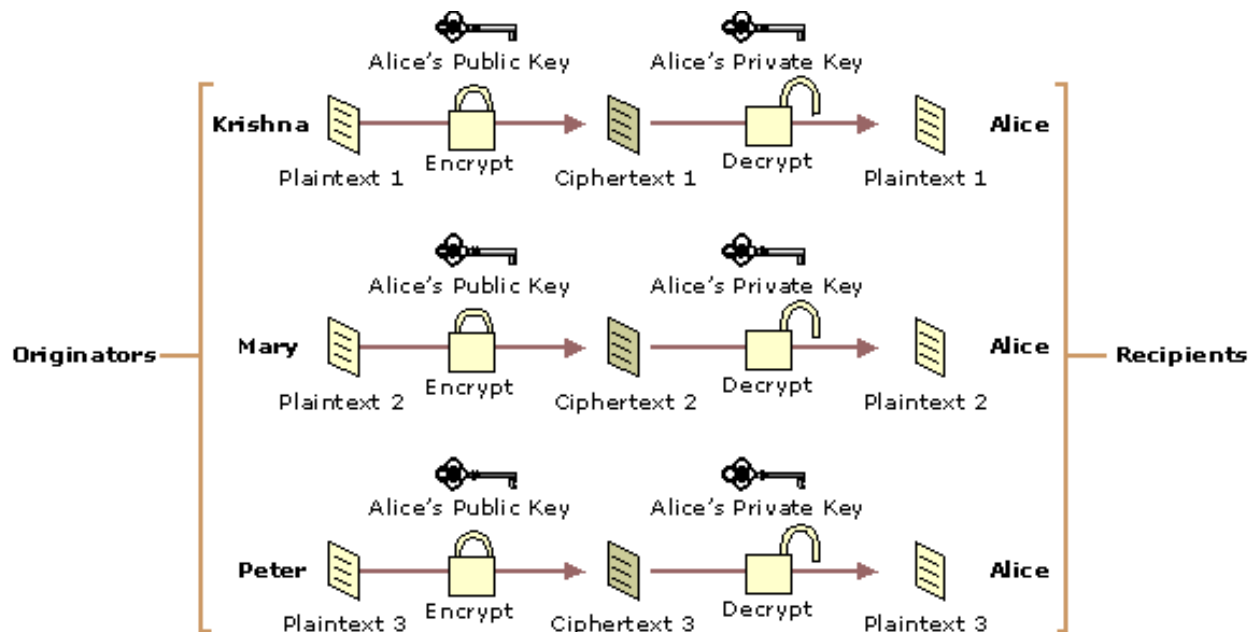

Fig: Encryption and Decryption with a Symmetric Key

Symmetric key encryption is much faster than public key encryption, often by 100 to 1,000 times. Symmetric key technology is generally used to provide secrecy for the bulk encryption and decryption of information.

Cryptography-based security technologies use a variety of symmetric key encryption algorithms to provide confidentiality. Symmetric algorithms have the advantage of not consuming too much computing power. People can use this encryption method as either a "**stream**" cipher or a "**block**" cipher, depending on the amount of data being encrypted or decrypted at a time. A stream cipher encrypts data one character at a time as it is sent or received; while a block cipher processes fixed block (chunks) of data. Common symmetric encryption algorithms include Data Encryption Standard (**DES**), Advanced Encryption Standard (**AES**), and International Data Encryption Algorithm (**IDEA**).

Asymmetric Key Encryption (Public Key Encryption):

Encryption algorithms that use different keys for encrypting and decrypting information are most often called public-key algorithms but are sometimes also called *asymmetric key algorit*. Public key encryption requires the use of both a private key (a key that is known only to its owner) and a public key (a key that is available to and known to other entities on the network). A user's public key, for example, can be published in the directory so that it is accessible to other people in the organization. The two keys are different but complementary in function. Information that is encrypted with the public key can be decrypted only with the corresponding private key of the set. Figure below shows basic encryption and decryption with asymmetric keys.

Fig: Encryption and Decryption with Asymmetric Keys

Today, public key encryption plays an increasingly important role in providing strong, scalable security on intranets and the Internet. Public key encryption is commonly used to perform the following functions:

- Encrypt symmetric secret keys to protect the symmetric keys during exchange over the network.
- Create digital signatures to provide authentication and non-repudiation for online entities.
- Create digital signatures to provide data integrity for electronic files and documents.

Algorithms that use public key encryption methods include RSA and Diffie-Hellman.

Common Cryptosystems
   a) **RSA Algorithm**: RSA is the most commonly used public key algorithm, although it is vulnerable to attack. Named after its inventors, Ron Rivest, Adi Shamir and Len Adleman, of the MIT, RSA was first published in 1978. It is used for encryption as well as for electronic signatures (discussed later). RSA lets you choose the size of your public key. The 512-bit keys are considered insecure or weak. The 768-bit keys are secure from everything but 1024-bit keys are secure from virtually anything.
   b) **Data Encryption Standards (DES)**: DES was developed by IBM in1974 in response to a public solicitation from the US Department of Commerce. It was adopted as a US federal standard in1977 and as a financial industry standard in1981. DES uses a 56-bit key to encrypt.
   c) **3DES**: A stronger version of DES, called 3DES or Triple DES, uses three 56-bit keys to encrypt each block. The first key encrypts the data block, the second key decrypts the data block, and the third key encrypts the same data block again. The 3DES version requires a 168-bit key that makes the process quite secure and much safer than plain DES.
   d) **RC4**: RC4 was designed by Ron Rivest RSA Data Security Inc. this variable-length cipher is widely used on the Internet as the bulk encryption cipher in the SSL protocol, with key length ranging from 40 to 128 bits. RC4 has a repudiation of being very fast.

    e) IDEA: IDEA (International Data Encryption Algorithm) was created in Switzerland in1991. it offers very strong encryption using 1 128-bit key to encrypt 64-bit blocks. This system is widely used as the bulk encryption cipher in older version of Pretty Good Privacy(PGP)

4.5 Digital signature,

Just as handwritten signatures or physical thumbprints are commonly used to uniquely identify people for legal proceedings or transactions, so digital signatures are commonly used to identify electronic entities for online transactions. A digital signature uniquely identifies the originator of digitally signed data and also ensures the integrity of the signed data against tampering or corruption.

One possible method for creating a digital signature is for the originator of data to create the signature by encrypting all of the data with the originator's private key and enclosing the signature with the original data. Anyone with the originator's public key can decrypt the signature and compare the decrypted message to the original message. Because only someone with the private key can create the signature, the integrity of the message is verified when the decrypted message matches the original. If an intruder alters the original message during transit, the intruder cannot also create a new valid signature. If an intruder alters the signature during transit, the signature does not verify properly and is invalid.

However, encrypting all data to provide a digital signature is impractical for following two reasons:
- The cipher text signature is the same size as the corresponding plaintext, so message sizes are doubled, consuming large amounts of bandwidth and storage space.
- Public key encryption is slow and places heavy computational loads on computer processors.

Digital signature algorithms use more efficient methods to create digital signatures. The most common types of digital signatures today are created by signing **message digests** with the originator's private key to create a digital thumbprint of the data. Because only the message digest is signed, the signature is usually much shorter than the data that was signed. Therefore, digital signatures place a relatively low load on computer processors during the signing process, consume insignificant amounts of bandwidth. Two of the most widely used digital signature algorithms today are the **RSA digital signature** process and the **Digital Signature Algorithm** (DSA).

RSA Data Security Digital Signature Process: In the RSA digital signature process, the private key is used to encrypt only the message digest. The encrypted message digest becomes the digital signature and is attached to the original data. Figure below illustrates the basic RSA Data Security digital signature process.
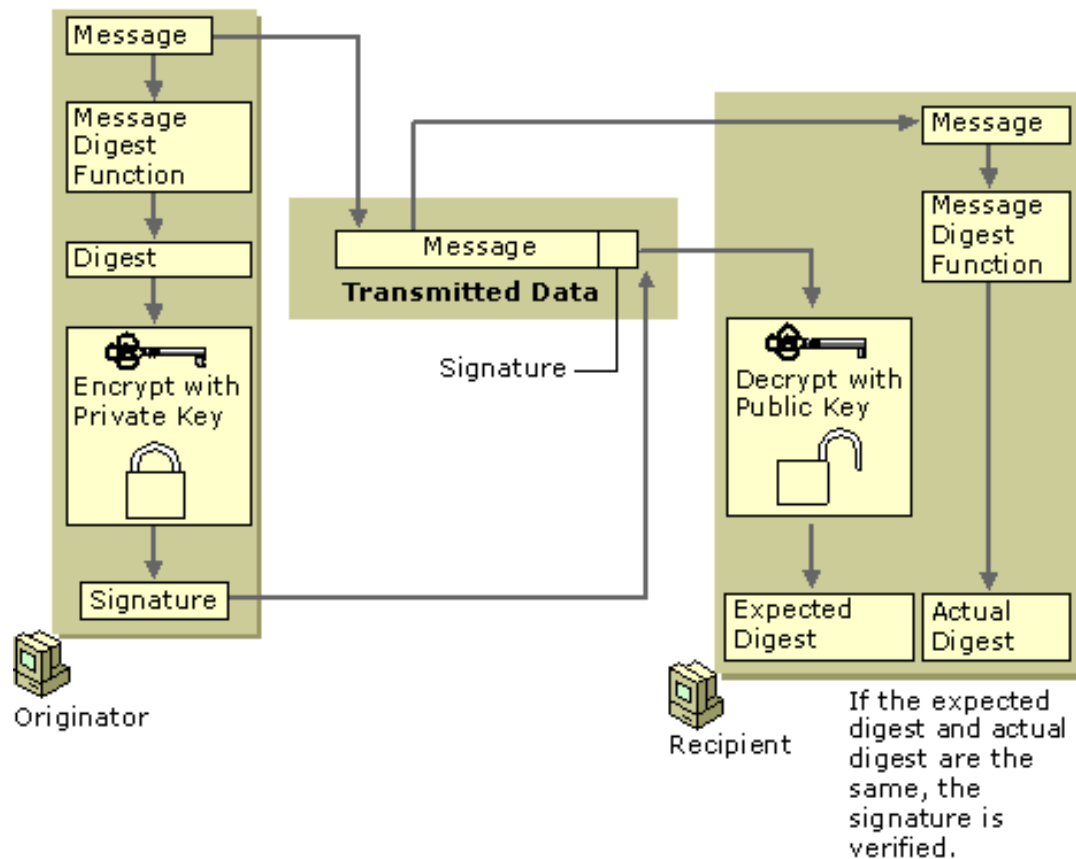
Fig: Basic RSA Data Security Digital Signature Process

To verify the contents of digitally signed data, the recipient generates a new message digest from the data that was received, decrypts the original message digest with the originator's public key, and compares the decrypted digest with the newly generated digest. If the two digests match, the integrity of the message is verified. The identification of the originator also is confirmed because the public key can decrypt only data that has been encrypted with the corresponding private key.

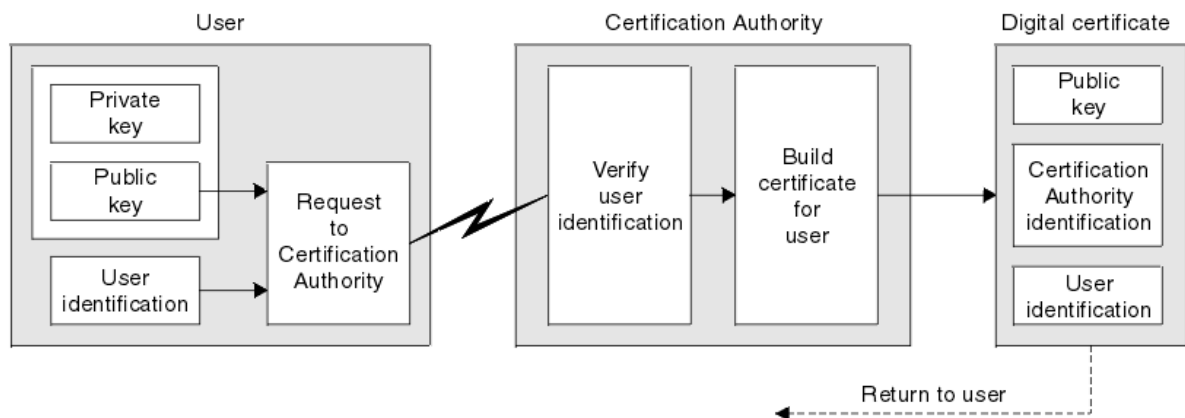## 4.6 Digital certificate and certification authority

Digital certificates are electronic credentials that are used to assert the online identities of individuals, computers, and other entities on a network. **Digital certificates** function similarly to identification cards such as passports and drivers licenses. Most commonly they contain a public key and the identity of the owner. They are issued by certification authorities (CAs) that must validate the identity of the certificate-holder both before the certificate is issued and when the certificate is used. Common uses include business scenarios requiring authentication, encryption, and digital signing.

Most certificates in common use today are based on the X.509v3 certificate standard. X.509v3 stands for version 3 of the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) recommendation X.509 for certificate syntax and format. Typically, certificates contain the following information:
- The subject's public key value
- The subject's identifier information, such as the name and email address
- The validity period (the length of time that the certificate is considered valid)
- Issuer identifier information

- The digital signature of the issuer, which attests to the validity of the binding between the subject's public key and the subject's identifier information

Process to obtain a Certificate From CA: One can obtain a certificate for your business from commercial CAs. The Issuing entities of commercial CAs provide certificate with a cost. User can generate a Key pair of its own and generate a Certificate Signing Request (CSR) and then send the CSR to Issuing CA for a certificate. CSR contains the public key of the user and user identity information in a format that issuing CAs would normally expect as shown in figure below.

A **Certificate Authority (CA)** issues digital certificates that contain a public key and the identity of the owner. The matching private key is not made available publicly, but kept secret by the end user who generated the key pair. The certificate is also a confirmation or validation by the CA that the public key contained in the certificate belongs to the person, organization, server or other entity noted in the certificate. A CA's obligation in such schemes is to verify an applicant's credentials, so that users and relying parties can trust the information in the CA's certificates. CAs uses a variety of standards and tests to do so. In essence, the Certificate Authority is responsible for saying "yes, this person is who they say they are, and we, the CA, verify that".

If the user trusts the CA and can verify the CA's signature, then he can also verify that a certain public key does indeed belong to whoever is identified in the certificate. Browsers maintain list of well known CAs root certificates. Aside from commercial CAs, some providers issue digital certificates to the public at no cost. Large institutions or government entities may have their own CAs.

Electronic Payment Systems

Electronic payment systems are becoming central to on-line business process innovation as companies look for ways to serve customers faster and at lower cost. Emerging innovations in the payment for goods and services in electronic commerce promise to offer a wide range of new business opportunities.

Electronic payment systems and e-commerce are intricately linked given that on-line consumers must pay for products and services. Clearly, payment is an integral part of the mercantile process and prompt payment (or account settlement) is crucial. If the claims and debits of the various participants—individuals, companies, banks, and nonbanks—are not balanced because of payment delay or, even worse default, then the entire business chain is disrupted. Hence an important aspect of e-commerce is prompt and secure payment, clearing, and settlement of credit or debit claims.

But on-line sellers face a problem: How will buyers pay for goods and services? What currency will serve as the medium of exchange in this new marketplace? Everyone agrees that the payment and settlement process is a potential bottleneck in the fast-moving electronic commerce environment if we rely on conventional payment methods such as cash, checks, bank drafts, or bills of exchange. Electronic replicas of these conventional instruments are not well suited for the speed required in e-commerce purchase processing. For instance, payments of small denominations (micropayments) must be made and accepted by vendors in real time for snippets(pieces) of information. 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.

We will examine these demands by looking at the following issues:
- What form and characteristics of payment instruments—for example, electronic cash, electronic checks, credit/debit cards—will consumers use?
- In on-line markets, how can we manage the financial risk associated with various payment instruments—privacy, fraud, mistakes, as well as other risks like bank failures? What security features (authentication, privacy, anonymity) need to be designed to reduce these risks?

To answer these questions, we will draw on examples of various electronic payment systems that have been proposed, prototyped, or actually deployed (implemented).

Types of Electronic Payment Systems: Electronic payment systems grow rapidly in banking, retail, health care, on-line markets, and even 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. Let's briefly describe the pertinent developments in various industries to provide an overall picture of electronic payment systems of the present.

Research into electronic payment systems for consumers can be traced back to the 1940s, and the first applications—credit cards—appeared soon after. In the early 1970s, the emerging electronic payment technology was labeled electronic funds transfer (EFT). EFT is defined as "any transfer of funds initiated through an electronic terminal, telephonic instrument, or computer or magnetic tape. EFT utilizes computer and telecommunication components both to supply and to transfer money or financial assets.

Work on EFT can be segmented into three broad categories:
1. **Banking and financial payments**
   - Large-scale or wholesale payments (e.g., bank-to-bank transfer)
   - Small-scale or retail payments (e.g., automated teller machines and cash dispensers)
   - Home banking (e.g., bill payment)
2. **Retailing payments**
   - Credit cards (e.g., VISA or MasterCard)
   - Private label credit/debit cards (e.g., J.C. Penney Card)
   - Charge cards (e.g., American Express)
3. *On-line electronic commerce payments*
   - Token-based payment systems
     - Electronic cash (e.g., DigiCash)
     - Electronic checks (e.g.; NetCheque)
     - Smart cards or debit cards (e.g., Mondex Electronic Currency Card)
   - Credit card-based payment systems
     - Encrypted credit cards (e.g., World Wide Web form-based encryption) Third-party authorization numbers (e.g., First Virtual)

Retail payments and large-scale payments between banks and business are widely recognized as the pioneering efforts in electronic commerce that involve the extensive use of EDI for transferring payment information.

Risks Associated with Electronic Payment System: Electronic payment is a popular method of making payments globally. It involves sending money from bank to bank instantly -- regardless of the distance involved. Such payment systems use Internet technology, where information is relayed through networked computers from one bank to another. Electronic payment systems are popular because of their convenience. However, they also may pose serious risks to consumers and financial institutions.

Tax Evasion

Businesses are required by law to provide records of their financial transactions to the government so that their tax compliance can be verified. Electronic payment however can frustrate the efforts of tax collection. Unless a business discloses the various electronic payments it has made or received over the tax period, the government may not know the truth, which could cause tax evasion.

Fraud

Electronic payment systems are prone to fraud. The payment is done usually after keying in a password and sometimes answering security questions. There is no way of verifying the true identity of the maker of the transaction. As long as the password and security questions are correct, the system assumes you are the right person. If this information falls into the possession of fraudsters, then they can defraud you of your money.

Impulse Buying

Electronic payment systems encourage impulse buying, especially online. You are likely to make a decision to purchase an item you find on sale online, even though you had not planned to buy it, just because it will cost you just a click to buy it through your credit card. Impulse buying leads to disorganized budgets and is one of the disadvantages of electronic payment systems.

Payment Conflict

Payment conflicts often arise because the payments are not done manually but by an automated system that can cause errors. This is especially common when payment is done on a regular basis to many recipients. If you do not check your pay slip at the end of every pay period, for instance, then you might end up with a conflict due to these technical glitches, or anomalies.

5.1 Digital token and E- payment systems,

None of the banking or retailing payment methods is completely adequate in their present form for the consumer-oriented e-commerce environment. Their deficiency is their assumption that the parties will at some time 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 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**" in the form of electronic cash/money or checks. Electronic tokens are designed as electronic analogs of various forms of payment backed by a bank or financial institution. Simply stated, electronic tokens are equivalent to cash that is backed by a bank.

Electronic tokens are of three types:

1. **Cash or real-time**: Transactions are settled with the exchange of electronic currency. An example of on-line currency exchange is *electronic cash* (*e-cash*).
2. **Debit or prepaid**: Users pay in advance for the privilege of getting information. Examples of prepaid payment mechanisms are stored in smart cards and electronic purses that store electronic money.
3. **Credit or postpaid**: The server authenticates the customers and verifies with the bank that funds are adequate before purchase. Examples of postpaid mechanisms are *credit/debit* cards and *electronic checks*.

5.2 E-cash,

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

E-cash focuses on replacing cash as the principal payment vehicle in consumer-oriented

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

Now compare cash to credit and debit cards. First, they can't be given away because, technically, they are identification cards owned by the issuer and restricted to one user. Credit and debit cards are not legal tender, given that merchants have the right to refuse to accept them. Nor are credit and debit cards bearer instruments; their usage requires an account relationship and authorization system. Similarly, checks require either personal knowledge of the payer or a check guarantee system. Hence, to really create a novel electronic payment method, we need to do more than recreate the convenience that is offered by credit and debit cards. We need to develop e-cash that has some of the properties of cash.

What is electronic cash? : Electronic cash is one of the instruments that can be used to conduct paperless transactions. Paperless transaction is a term used to describe financial exchanges that do not involve the physical exchange of currency. Instead, monetary value is electronically credited and debited. Often called e-cash or digital money, this financial instrument is commonly used to conduct distant transactions, such as those between parties on the Internet and those between parties in different countries.

In most cases, e-cash is equivalent to paper currency and can therefore be exchanged among individuals or spent for any types of goods or services that a person wishes to acquire. This financial instrument has played a large role in the increasing popularity of telecommuting, which is an arrangement that allows people to work together in distant places.

Digital currency can allow a freelancer in Nepal to be paid for work that the he did for a contractor in Canada. This is possible due to a monetary exchange system. The value of that money is then credited to someone else in another place. The paper currency the sender presents or which is taken from his account is not physically sent and given to the receiver. Electronic cash is exchanged in a similar way. One major difference, however, is that transactions can often be conducted without a live middle man.

People involved in electronic cash transfers may never acquire any paper currency. They may receive their funds electronically and they may use them electronically. This does not mean, however, that it is impossible to get paper currency from electronic cash.

In many instances, electronic money can be converted into paper currency quite easily. This is possible because e-cash is commonly held in an account that can be accessed in several ways. For example, many have debit cards that can be used at an automated teller machine (ATM). Sometimes, a person can request that all or a portion of the money held electronically be made available by check.

There are a number of advantages of electronic cash. One of them is that it eliminates the apprehension that many people feel about carrying and exchanging paper currency.

Another advantage of electronic cash is that it is usually easily converted to another currency, making traveling and international business substantially easier.
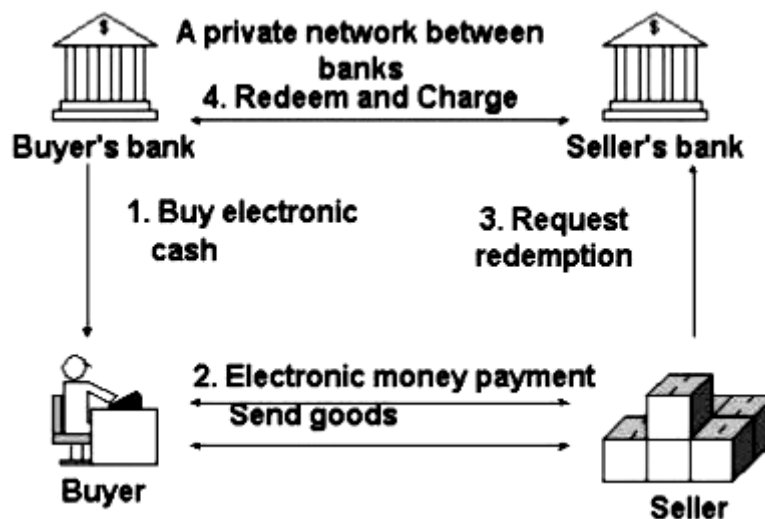

Fig: Transaction of Electronic Cash.

The figure shows the basic operation. User A obtains digital cash "coins" from her bank (and the bank deducts a corresponding amount from her account). The user is now entitled to use the coins by giving them to another user B, which might be a merchant. B receives e-cash during a transaction and see that it has been authorized by a bank. They can then pay the cash into their account at the bank.

Ideal properties of a Digital Cash system should be:
1. **Secure**. Alice should be able to pass digital cash to Bob without either of them, or others, able to alter or reproduce the electronic token.
2. **Anonymous**. Alice should be able to pay Bob without revealing her identity, and without Bob revealing his identity. Moreover, the Bank should not know who Alice paid or who Bob was paid by. Even stronger, they should have the option to remain anonymous concerning the mere existence of a payment on their behalf.
3. **Portable**. The security and use of the digital cash is not dependent on any physical location. The cash should be able to be stored on disk or USB memory stick, sent by email, SMS, internet chat, or uploaded on web forms. Digital cash should not be restricted to a single, proprietary computer network.
4. **Off-line capable**. The protocol between the two exchanging parties is executed off-line, meaning that neither is required to be host-connected in order to proceed.
5. **Wide acceptability**. The digital cash is well-known and accepted in a large commercial zone. With several digital cash providers displaying wide acceptability, Alice should be able to use her preferred unit in more than just a restricted local setting.
6. **User-friendly**. The digital cash should be simple to use from both the spending perspective and the receiving perspective. Simplicity leads to mass use and mass use leads to wide acceptability. Alice and Bob should not require a degree in cryptography as the protocol machinations should be transparent to the immediate user.

Here is the summary of the pros and cons of the online electronic cash system:
Pros
• Provides fully anonymous and untraceable digital cash:

- No double spending problems (coins are checked in real time during the transaction).
- No additional secure hardware required

Cons

- Communications overhead between merchant and the bank.
- Huge database of coin records -- the bank server needs to maintain an ever-growing database for all the used coins' serial numbers.
- Difficult to scale, need synchronization between bank servers.
- Coins are not reusable

5.3 E- Cheque,

When you write a check, you may assume that the piece of paper you write on will be deposited at a bank and processed manually. Electronic check conversion makes that process less and less likely. Instead of processing the piece of paper, some businesses prefer to turn your paper check into an electronic check.

How Electronic Checks Work? How does a piece of paper become an electronic check? The business you write the check to slips the check into a machine that reads information from your check. That information is all the business needs to collect money from your bank account.

With E-Checks, a check imager is connected to a small printer through a credit card terminal directly at the point of sale. When a customer presents a check, the check is scanned by the imager, the magnetic data (MICR) indicating the bank routing number and account number are read, and the dollar amount of the check is entered. The E-Check process verifies the check by comparing the check's bank account and the customer's driver's license with a national negative database to determine if the account has a fraud history, is closed, or has had insufficient funds (NSF) problems. If the check is approved, a receipt is printed for customer signature. The check and a copy of the signed receipt are returned to the customer. The captured data is used in the electronic transfer of money through the Automated Clearing House (ACH) system.
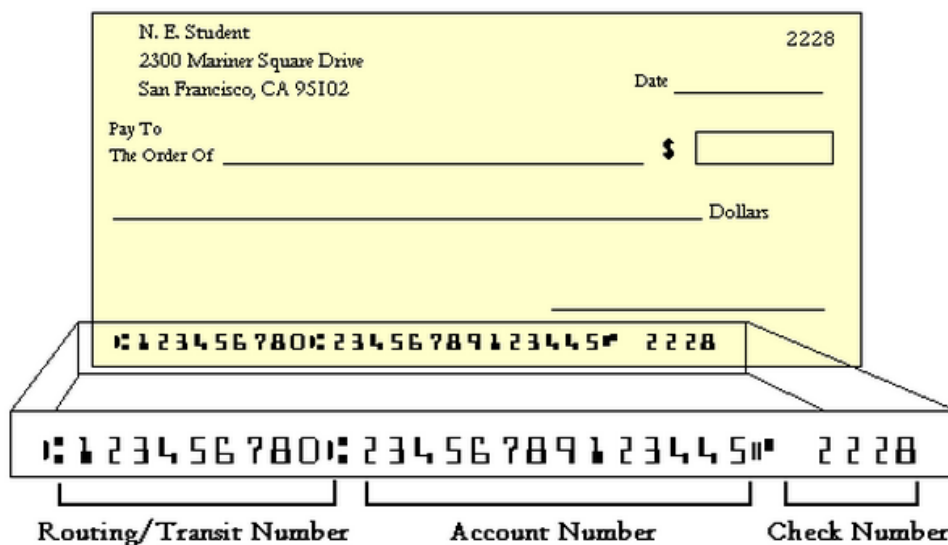

Fig: Electronic Check Format.

Merchant benefits of converting checks to an electronic form:
- Saves you time with your deposits - no more bank runs or long teller lines.
- Lowers traditional bank fees, like per item deposit and returned item fees.
- Funds you quickly, usually within 2 business days of the original transaction.
- Secures your customer's personal and bank account information by returning the original item to the check writer.
- Provides your customers complete transaction information for easy bank reconciliation, as well as providing sales information, like store name and location.
- Expandable equipment is simple and user friendly.
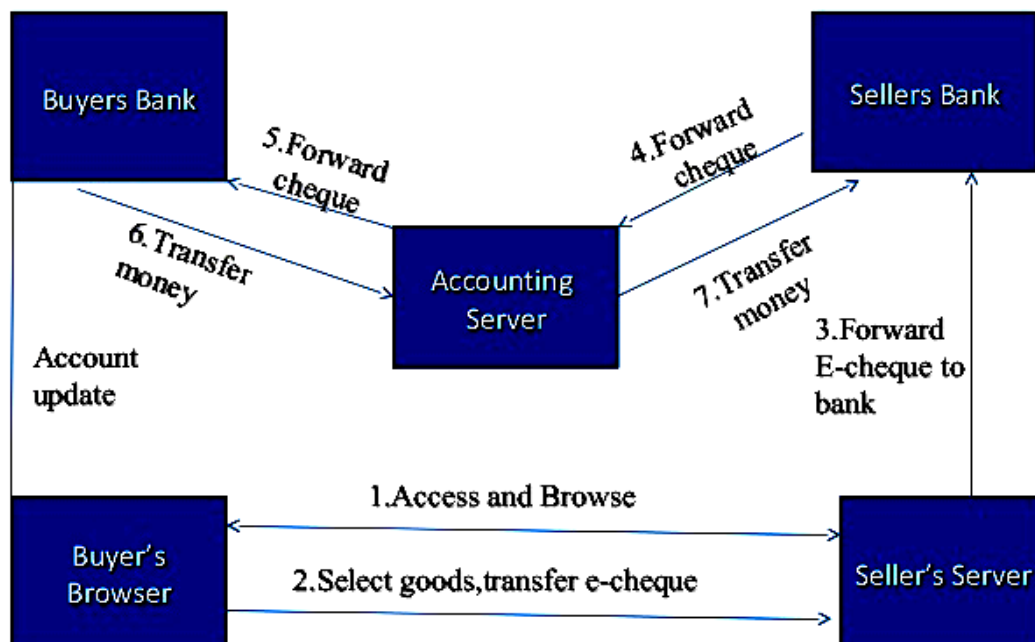
Impact of Electronic Checks: Electronic checks allow businesses to process payments more quickly. As a result, the money will come out of your checking account sooner than you might expect. You need to make sure you have enough money in your account when you write a check, and you can't rely on 'float' time as much as you might have in the past. Keep a balanced checkbook and consider some type of overdraft protection plan. Since you're paying electronically anyway, you now have even less reason to write checks the old fashioned way.

Where Electronic Check Conversion Happens? Your paper checks may be converted to electronic checks right in front of you, or it may happen when you mail a check to somebody to pay a bill. Either way, they're making an electronic check so that they can process your payment electronically.

Electronic Check Disclosure and Identification: Businesses are supposed to notify you that they're making an electronic check. If you're in a store, there should be a sign near the register that says they'll turn your paper check into an electronic check. If you're mailing in a check to pay a bill, the company probably disclosed their electronic check policy somewhere in the fine print of an agreement or on the back of your statement. If

the cashier drops your check into a machine and hands it back to you when you make a purchase, they've used an electronic check.

5.4 Smart card,

A smart card is a device that includes an embedded integrated circuit chip (ICC) that can be either a secure microcontroller or equivalent intelligence with internal memory or a memory chip alone. The card connects to a reader with direct physical contact or with a remote contactless radio frequency interface. With an embedded microcontroller, smart cards have the unique ability to store large amounts of data, carry out their own on-card functions (e.g., encryption and mutual authentication) and interact intelligently with a smart card reader. Smart card technology is available in a variety of form factors, including plastic cards, fobs, subscriber identity modules (SIMs) used in GSM mobile phones and etc.

*Smart Card Technology: There are two general categories of smart cards: **contact** and **contactless** as shown in figure below*.
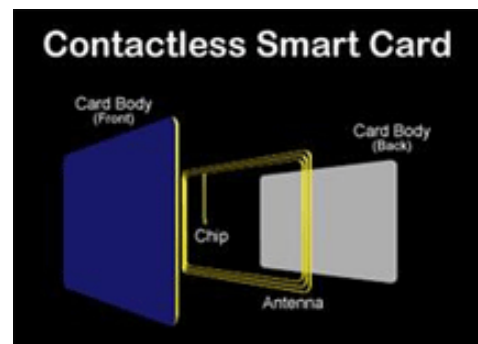
A contact smart card must be inserted into a smart card reader with a direct connection to a conductive contact plate on the surface of the card (typically gold plated). Transmission of commands, data, and card status takes place over these physical contact points.

A contactless card requires only close proximity to a reader. Both the reader and the card have antennae, and the two communicate using radio frequencies (RF) over this contactless link. Most contactless cards also derive power for the internal chip from this electromagnetic signal. The range is typically one-half to three inches for non-battery-powered cards, ideal for applications such as building entry and payment that require a very fast card interface.

Two additional categories of cards are **dual-interface cards** and **hybrid cards**. A hybrid card has two chips, one with a contact interface and one with a contactless interface. The two chips are not interconnected. A dual-interface card has a single chip with both contact and contactless interfaces. With dual-interface cards, it is possible to access the same chip using either a contact or contactless interface with a very high level of security.

The chips used in all of these cards fall into two categories as well: microcontroller chips and memory chips. A memory chip is like a small floppy disk with optional security. Memory chips are less expensive than microcontrollers but with a corresponding decrease in data management security. Cards that use memory chips depend on the

security of the card reader for processing and are ideal for situations that require low or medium security.

A microcontroller chip can add, delete, and otherwise manipulate information in its memory. A microcontroller is like a miniature computer, with an input/output port, operating system, and hard disk. Smart cards with an embedded microcontroller have the unique ability to store large amounts of data, carry out their own on-card functions (e.g., encryption and digital signatures) and interact intelligently with a smart card reader.

The selection of a particular card technology is driven by a variety of issues, including:
- Application dynamics
- Prevailing market infrastructure
- Economics of the business model
- Strategy for shared application cards

Smart cards are used in many applications worldwide, including:
- **Secure identity applications** - employee ID badges, citizen ID documents, electronic passports, driver's licenses, online authentication devices
- **Healthcare applications** - citizen health ID cards, physician ID cards, portable medical records cards
- **Payment applications** - contact and contactless **credit/debit cards**, transit payment cards
- **Telecommunications applications** - GSM Subscriber Identity Modules, pay telephone payment cards
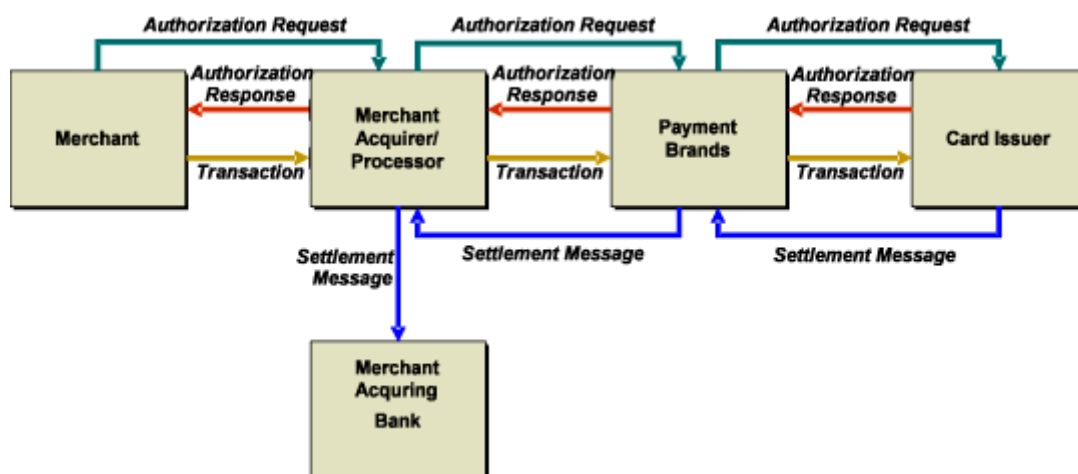
5.5 Credit Card based payment system

"A generation ago, it wasn't all that unusual to be out for dinner with friends or at the register with a cart full of groceries and realize you didn't have enough cash to cover the bill. But today, you're likely to pull out a debit or credit card and not think anything of it."

It's hard now to imagine a time when those noncash options weren't available — especially if you were born in the 1970s or later. Credit cards have been around since the 1950s, and debit cards were introduced in the mid-1970s. By 2006, there were 984

million bank-issued Visa and MasterCard credit and debit cards in the United States alone.

Though the two types of cards may be used interchangeably, there are notable differences between them. Let's start with debit cards.

Debit Cards: Debit cards are linked to your bank account so the money you spend is automatically deducted from your account. They provide a convenient alternative to cash, especially if you do a lot of shopping online. Debit cards can also help you budget. Use your card to pay your bills and day-to-day expenses and your monthly statement will provide a good snapshot of how much you spend per month and where it's going. There's another benefit as well: Unlike credit cards, your bank balance goes down with each debit card transaction, so you're less likely to overspend. (Many banks offer "overdraft protection" that allows you to exceed your balance. But you'll end up paying interest, and maybe extra fees, on the money you borrow from your overdraft account.)

With so many benefits to the debit card, why use a credit card at all? There are three main reasons: You can spend more than you have — or postpone paying, at least — and you typically get better rewards and better protection than you do with debit cards.

Credit Cards: Credit cards basically allow you to use someone else's money (the card issuer's) to make a purchase while you pay the money back later. If you do so within the billing period — generally, 15 to 45 days — you can avoid paying any interest on it. The problem arises, of course, when you don't pay the balance in full and are charged interest as well. That can quickly add up. If it takes you two years to pay off a $500 balance, for example, and you're being charged 18 percent interest, you'll end up paying nearly $100 more in interest.

If you use them responsibly though, credit cards can offer other advantages. They help build your credit, as long as you pay your bills on time. Some also offer rewards that you can use to get gifts, cash back or discounts for products, services and special events. They also provide more protection if someone steals your card or bank information. If you notice a fraudulent charge on your credit card account, you can call the card issuer, make a dispute claim, and the charge should be removed from your balance. But if thieves steal your debit card information and use it, it may take weeks for the bank to investigate your claim and replace the lost funds. In the meantime, you may have to deal with a dwindling bank balance or bounced checks.

Federal law also protects you if you need to dispute charges on a credit card, but not if you use a debit card or other forms of payment. If you paid cash or used a debit card, the retailer already has your money. So you have a lot less leverage, and there's no guarantee you'll get that money back. But if you pay for something with your credit card and aren't happy with the purchase, your card issuer can legally withhold payment from the retailer until they resolve the dispute, and you won't be charged.

For most people, using both a debit card and credit card makes sense. The key is not to spend more than you have with either. If you can do that, you'll be able to enjoy the benefits that each provide.

Working Techniques of Credit Cards: Credit card payment processing for the e-commerce electronic payment system takes place in two phases: <u>authorization</u> (getting approval for the transaction that is stored with the order) and <u>settlement</u> (processing the sale which transfers the funds from the issuing bank to the merchant's account). The flow charts below represent the key steps in the process starting from what a customer sees when placing an order through completing the sale and finishing with the merchant processing the sale to collect funds.
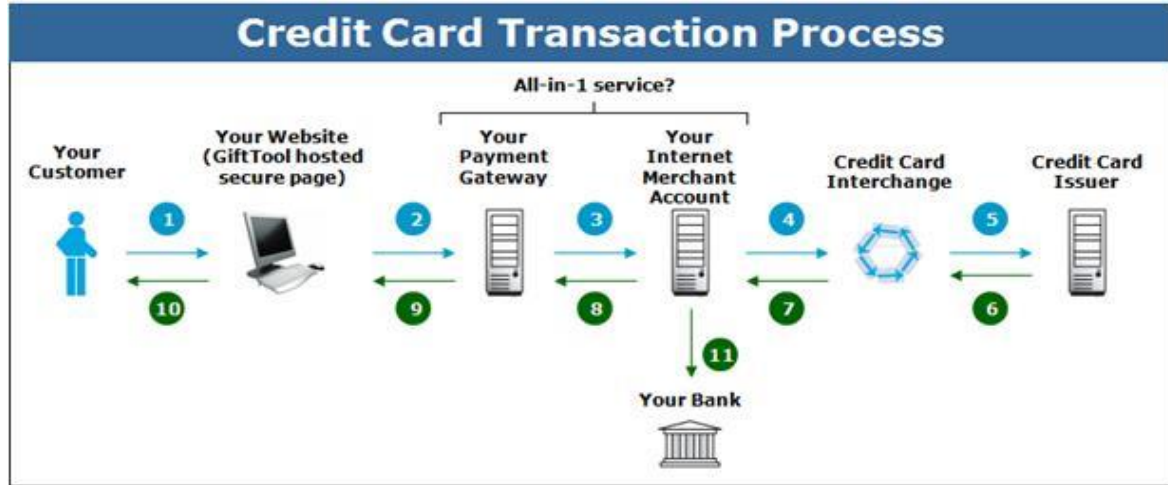
Benefits and Limitations of Credit Cards: Advantages and Disadvantages of Credit Cards are:

Advantages	Disadvantages
Convenience--Credit cards can save your time and trouble--no searching for an ATM or keeping cash on-hand.	**Overuse**--Revolving credit makes it easy to spend beyond your means.
Record keeping--Credit card statements can help you track your expenses. Some cards even provide year-end summaries that really help out at tax time.	**Paperwork**--You'll need to save your receipts and check them against your statement each month. This is a good way to ensure that you haven't been overcharged.
Low-cost loans--You can use revolving credit to save today (e.g., at a one-day sale), when available cash is a week away.	**High-cost fees**--Your purchase will suddenly become much more expensive if you carry a balance or miss a payment.
Instant cash--Cash advances are quick and convenient, putting cash in your hand when you need it.	**Unexpected fees**--Typically, you'll pay between 2 and 4 percent just to get the cash advance; also cash advances usually carry high interest rates.
Build positive credit--Controlled use of a credit card can help you establish credit for the first time or rebuild credit if you've had problems in the past--as long as you stay within your means and pay your bills on time.	**Deepening your debt**--Consumers are using credit more than ever before. If you charge freely, you may quickly find yourself in over your head--as your balance increases, so do your monthly minimum payments.
Purchase protection--Most credit card companies will handle disputes for you. If a merchant won't take back a defective product, check with your credit card company.	**Homework**--It's up to you to make sure you receive proper credit for incorrect or fraudulent charges.

E-Marketing

eMarketing is any marketing done online via websites or other online tools and resources.

eMarketing can include paid services while other methods are virtually free. A wide variety of eMarketing methods are at your disposal, including: direct email, SMS/text messaging, blogs, webpages, banners, videos, images, ads, social media, search engines, and much, much more.

6.1 Traditional marketing,

Traditional marketing is a rather broad category that incorporates many forms of advertising and marketing. It's the most recognizable typse of marketing, encompassing the advertisements that we see and hear every day. Most traditional marketing strategies fall under one of four categories: print, broadcast, direct mail, and telephone.

- **Print:** Includes advertisements in newspapers, newsletters, magazines, brochures, and other printed material for distribution
- **Broadcast:** Includes radio and television commercials, as well as specialized forms like on-screen movie theater advertising
- **Direct mail:** Includes fliers, postcards, brochures, letters, catalogs, and other material that is printed and mailed directly to consumers
- **Telemarketing:** Includes requested calling and cold calling of consumers over the phone

6.2 On-line 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. 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 pace 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's 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

This uses online technology to expand their horizons, 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.

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 are:

1) The consumer, responding to net-based marketing presentation, sends in a check 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 net.
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 net, 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 unsecured 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 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.

Advantage of Online Marketing

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 catalogs, brochures, and specification sheets do not have to be printed, packaged, stored, or shipped.
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.
4) Online marketing gives customers another way to buy, while enabling them to take control of the purchasing process.
5) Online marketing can be information-rich and interactive. It appeals to information-hungry buyers and analytical buyers.
6) Online marketing can offer you instant international reach and indeed, online networks have created an instant global community.
7) Online marketing can lower barriers to entry and offer equal opportunity for access.
8) Online marketing can be continuously available.

Components of online marketing:

- **Setting up a website:** Consisting of text, images and possibly audio and video elements used to convey the company's message online, to inform existing and potential customers of the features and benefits of the company's products and/or services we set the website. The website may or may not include the ability to capture leads from potential customers or directly sell a product or service online. Websites can be the internet equivalents of offline brochures or mail order catalogs and they are a great way to establish your business identity.

- **Affiliate Marketing:** In affiliate marketing, a business recruits associates to promote the company's products or services. The associates receive a commission or other similar rewards for every sale, visitor, subscriber, or customer they bring to the company. Amazon.com associates central is an example of an affiliate marketing program that amazon.com uses to encourage private website owners to bring traffic to its site.

- **Display advertising:** Display advertising involves the use of web banners or banner ads placed on a third-party website to drive traffic to a company's own website and increase product awareness.

- **E-mail marketing:** Companies that use email marketing send promotional emails directly to customers. However, it can often be hard to distinguish between spam and legitimate email marketing messages.

- **Interactive advertising:** Interactive advertising involves the use of animations and other graphic techniques to create ads that engage the viewer and invite participation.

- **Search engine marketing:** Search Engine Optimization (SEO), paid placement, and paid inclusion are search engine marketing techniques that companies can use to increase their visibility in the search engine page results from Google and its competitors.

- **Viral Marketing:** Viral marketing is a technique in which companies encourage customers to pass along information about their products or services. Company websites that let visitors email interactive games or funny video clips to their friends are an example of a viral marketing effort.

- **Banner advertising:** It is the placement of ads on a website for a fee. The offline equivalent of this form of online marketing would be traditional ads in newspapers or magazines.

- **Article marketing:** It involves writing articles related to your business and having them published online on syndicated article sites. These articles then have a tendency to spread around the Internet since the article services permit re-publication provided that all of the links in the article are maintained. Article marketing can result in a traffic boost for your website, and the distribution of syndicated articles can promote your brand to a wide audience.

- **Online press releases:** It involve placing a newsworthy story about a company, its website, its people, and/or its products/services with online services.

- **Blog marketing:** It is the act of posting comments, expressing opinions or making announcements in a discussion forum and can be accomplished either by hosting your own blog or by posting comments and/or URLs in other blogs related to your product or service online.

6.3 E-advertising,

Online advertising is a marketing strategy that involves the use of the Internet as a medium to obtain website traffic and target and deliver marketing messages to the right customers. Online advertising is geared toward defining markets through unique and useful applications. Since the early 1990s there has been an exponential increase in the growth of online advertising, which has evolved into a standard for small and large organizations.

Online advertising is also known as Internet advertising.

A major advantage of online advertising is the quick promotion of product information without geographical boundary limits. A major challenge is the evolving field of interactive advertising, which poses new challenges for online advertisers.

Online advertisements are purchased through one of the following common vehicles:
- **Cost per Thousand (CPM):** Advertisers pay when their messages are exposed to specific audiences.
- **Cost per Click (CPC):** Advertisers pay every time a user clicks on their ads.
- **Cost per Action (CPA):** Advertisers only pay when a specific action (generally a purchase) is performed.

Examples of online advertising include banner ads, search engine results pages, social networking ads, email spam, online classified ads, pop-ups, contextual ads and spyware.

Various Means of Advertising

E-mail
The advent ages of e-mail are its low cost and the ability to reah a wide variety of targeted audiences. Most companies develop a customer database to whom they send e-mails. E-mal is emerging as a marketing channel that affords cost-effective implementation and better, quicker response rates than other advertising channels.

Banners
Web banners or banner ads are advertisements that are embedded into web pages similar to the way advertisers pay for space within a magazine. Web banners are designed to drive traffic to a website and account for 54% of total online advertising revenue [2]. Web banners and pop-ups can be the useful tools for online advertisers; however new web browsers provide the web surfer with options to prevent pop-ups and turn off images from selected (or all) websites. Beside that, similar to the protection of computer against the virus here come the anti-spyware or anti-adware softwares, such as SpywareBlaster and Lavasoft Ad-Aware.

Skyscrapers
These are extra-long ads running down the right or left side of a web site.

Banner swapping
Banner swapping is nothing but a direct exchange of links between web sites. 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.

Effectiveness Tracking
This is an upstart Dynamic Logic 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.

Online Promotion Tools and Techniques
Inline with the traditional offline marketing approach of mixing advertising, marketing, and promotion techniques, online marketing is made up of more than just advertising. Site layout and features, editorial content (on the organisation's site, as well as cross promotion and/or a media campaign targeting online authorities in related fields similar to an offline media campaign), sponsorships, competitions, giveaways and integrated online/offline campaigns are all designed (in effective websites) to work together, complementing each other and to ensure not only return traffic to an e-tailers site, but to ensure consistent brand messages are sent to consumers.

Email marketing is the most utilised form of direct marketing in the online environment. Email is an effective format for marketers to use as it provides a quick and efficient way to communicate both commercial messages to a specified audience, allowing customised mass communication.

Search Engine Marketing

People commonly use links and searching tools on a portal site to search for information on the internet. Typing in the words or phrases related to what they are looking for and waiting for the search engines to list out the relevant sites. Thus Search Engine Marketing (SEM) is a highly effective method of driving highly targeted visitors to one's web site. SEM is based on search engine optimization (SEO), search engine submission, link popularity, and log file and traffic analysis. These basics allow positioning of one's site for maximum search engine visibility.

Pay Per Click (PPC)

Pay per click (PPC) or also known as cost per click (CPC) is the amount or commissions that the advertisers will pay to the affiliate for each click on their ad banners. Pay per click advertisements are commonly used in web portal and affiliate programs, for example Google AdWords and Hits4Pay respectively. In web portals, it is mostly in the form of text ads which are placed near the search result.

Rich Advertising

Rich (media) advertising was a concept dreamed up to help marketers reach consumers jaded with traditional static advertising. With click through rates (CTR) averaging at a startlingly low 0.5% (Miletsky, 2002), it became evident that banners that entertained or surprised viewers with their interactivity before they were even clicked had a definite edge (Mand, 1998). Flash, Shockwave, Real Audio/Video, pull-down menus, search boxes and applets allow for new levels of interactivity.

Interactive media

Interactive media offers marketers many opportunities not readily available in traditional

offline sources. For example companies are now able to offer flash-based demonstrations or tutorials of their products online. Advances in computer and video gaming has allowed companies to not only buy space within games to promote their product or brand (for example a billboard within popular driving game "Grand Theft Auto: San Andreas) but to have games integrate their product and to build components of the game around their product - although this has raised discussions regarding maintaining the integrity of a game so it does not become purely an advertising vehicle which will turn gamers off (See advergaming; gamevertising). Expanding interactive media technology has become a catalyst for and product of collaborative approaches in forming or redefining products and services in the marketplace, resulting in innovative ideas becoming reality on a daily basis (Adegoke, 2005).

RSS Advertising

RSS is stands for Rich Site Summary or Really Simple Syndication which is a XML-based format to syndicate content among different websites. RSS advertising is the integration of RSS into online advertising. According to Pheedo, by integrating online advertising into an RSS feed, a new online advertising technique, it has achieved measurably better results than e-mail for its client. RSS advertising can avoid from Spam, email filtering and pop-up blocking system

E-branding
A know 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

Elements of Branding
The key elements of a brand are differentiation, relevance value. Product differentiation is the first condition that must be met with to creat a product or a service brand. The company must clearly distinguish its product from all others in the market. This makes branding for commodity products such as salt, nails, or plywood difficult, but not impossible.

If a brand has established that it is different fro 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 leavel 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 'mead-brand' status. According to Opinion Research Corporation International, the following Net names are top-of-mind with Americans: America Online, Yahoo, Netscape, and Amazon. Com, price line. Com, Info seek and Excite Ineloquent conducted a research and asked 10,000 randomly selected Internet users

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 spiral 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.

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).

6.4 Browsing behavior

Ecommerce terms like "browsing," "checkout" and "shopping cart" might make you think that the online shopping process is just like the brick-and-mortar shopping process. In fact, it's much different, as a recent report by Hook logic reveals. The report surveyed consumers who had shopped online in the past three months to explore how online shoppers browse and buy. Here's what you need to know:

When consumers shop offline, they make many of their decisions before they ever go into a store. Typically, consumers know what they want to buy (for example, running shoes), decide what store to visit and then browse the selection and, in many cases, buy.

But when consumers shop online, it's a very different process. Some 40 percent of online shoppers don't even have a specific product category in mind when they start browsing. They're more likely to skip from website to website as they browse...and browse. They might fill up a shopping cart on one site, abandon it and head to another site, then start all over again on a different device. They might buy online...or end up heading out to a store. No wonder that on average, fewer than 3 percent of online browsers actually make a purchase!
The average online shopper visits 2.7 sites when making a purchase. Three in 10 shoppers visit only one website; over 50 percent visit two or three sites and 11 percent visit four or more.

Even after a consumer finds a product, half will compare similar products on the same retail website, while another 25 percent will compare products on different retail sites, and 20 percent put products in their carts to save them, but don't buy immediately.

Online browsing presents significant opportunity for online retailers to capture customers. Some 70 percent of consumers browse retail websites at least once a month, 20 percent browse weekly, and nearly 10 percent buy weekly.

The report identified two kinds of purchases: "spontaneous," where the customer decides to buy something and completes the purchase in one to two hours, and "considered," where the customer spends one to three days considering and researching the purchase. As you can see, even "considered" purchases that involve lots of online research, comparison shopping and price checking, the overall time to purchase is less than two days. (The one exception: In major purchase categories such as electronics, consumers often start researching weeks or months before they actually buy.)

What do these results mean to you?
- Speed is of the essence. You don't have much time to grab that browsing consumer and turn him or her into a buyer.
- Use online advertising and SEO to grab customers who are searching for what you sell. If your search results are high enough or your online ad is tempting enough, you could get them to your site.
- Reach out. Use email automation to reach out to customers with abandoned shopping carts and remind them of their wares. Use online chat to pop up and offer to answer questions when you see customers browsing. Don't wait too long—you may only have a few hours before the customer makes the decision.
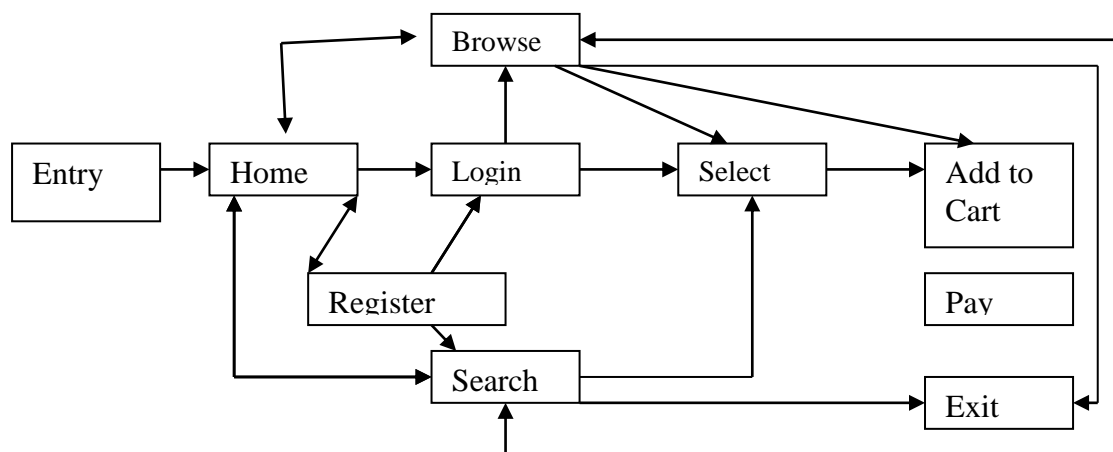
The given model is in the from of a graph and is called the Browser Model Graph (BBMG). The nodes of the BBMG represented by rectangles, depict the states a customer is in during a visit to the e-commerce site. Arrows connecting the states indicate possible transitions between them.

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 modeling convenience and does correspond to any action initiated by the customer.

Home

This is the state a customer I 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 videostore, 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 these links, a customer moves to this.

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

M-Commerce

UNIT-7

7.1 Definition of M-Commerce,

M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as cellular telephone and personal digital assistants (PDAs). Known as next-generation e-commerce, m-commerce enables users to access the Internet without needing to find a place to plug in. The emerging technology behind m-commerce, which is based on the Wireless Application Protocol (WAP), has made far greater strides in Europe, where mobile devices equipped with Web-ready micro-browsers are much more common than in the United States.

As content delivery over wireless devices becomes faster, more secure, and scalable, there is wide speculation that m-commerce will surpass wireless e-commerce as the method of choice for digital commerce transactions. The industries affected by m-commerce include:

- **Financial services**, which includes mobile banking (when customers use their handheld devices to access their accounts and pay their bills) as well as brokerage services, in which stock quotes can be displayed and trading conducted from the same handheld device
- **Telecommunications**, in which service changes, bill payment and account reviews can all be conducted from the same handheld device
- **Service/retail**, as consumers are given the ability to place and pay for orders on-the-fly
- **Information services**, which include the delivery of financial news, sports figures and traffic updates to a single mobile device

IBM and other companies are experimenting with speech recognition software as a way to ensure security for m-commerce transactions.

In comparison to e-commerce, m-commerce offers both advantages and disadvantages. The following list summarizes the advantages of m-commerce:
- **Ubiquity:** The use of wireless device enables the user to receive information and conduct transactions anywhere, at anytime.
- **Accessibility:** Mobile device enables the user to be contacted at virtually anytime and place. The user also has the choice to limit their accessibility to particular persons or times.
- **Convenience:** The portability of the wireless device and its functions from storing data to access to information or persons.
- **Localization:** The emergence of location-specific based applications will enable the user to receive relevant information on which to act.
- **Instant Connectivity (2.5G):** Instant connectivity or "always on" is becoming more prevalent will the emergence of 2.5 G networks, GPRS or EDGE. Users of 2.5 G services will benefit from easier and faster access to the Internet.
- **Personalization:** The combination of localization and personalization will create a new channel/business opportunity for reaching and attracting customers. Personalization will take the form of customized information, meeting the users'

preferences, followed by payment mechanisms that allow for personal information to be stored, eliminating the need to enter credit card information for each transaction.
- **Time Sensitivity**: Access to real-time information such as a stock quote that can be acted upon immediately or a sale at a local boutique.
- **Security:** depending on the specific end user device, the device offers a certain level of inherent security.

The following list summarises the disadvantages of m-commerce:
1. Mobile devices offer limited capabilities (such as limited display). Between mobile devices these capabilities vary so much that end user services will need to be customized accordingly.
2. The heterogeneity of devices, operating systems and network technologies is a challenge for a uniform end user platform. For this reason, standardization bodies consisting of telecommunication companies, device manufacturers and value added service providers integrate their work.
3. Mobile devices are more prone to theft and destruction.
4. The communication over the air interface between mobile device and network introduces additional security threats.
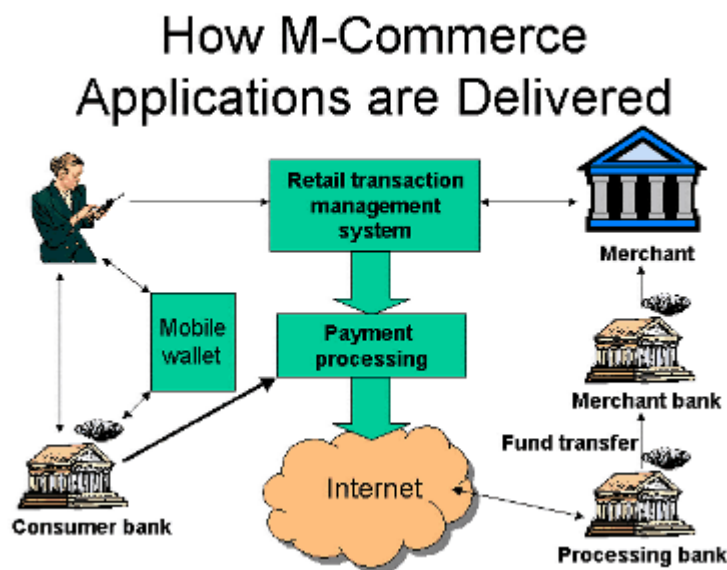
7.2 Differences between E-Commerce and M-Commerce,

Both of these terms have different meanings though both aim at making consumer lives easier. To understand more the differences between E-commerce and M-commerce, please have a look at the following table

Criteria	E-commerce	M-commerce
Definition	Electronic Commerce (or also called E-commerce) refers to the activities of buying and selling products and services with the use of electronic systems such as the internet.	Mobile Commerce (or also called M-commerce) refers to the process of buying and selling products and services with the use of internet/cellular data.
History	1970's	1990's

Devices used	Computers, laptops…	Wireless handheld devices such as cell phones, iPads, tablets…
The use of Internet	Mandatory	Not mandatory(allow the use of offline mode, might not work properly though)
Connectivity	Smaller	Larger owing to the bigger number of mobile users
Mobility	Limited	Less limited because of lighter weight and smaller size leading to easier to carry
Reach	Only at the places where the electricity and the internet are available	Broader due to its portability
Payment gateway	Credit cards	Caller's rate, mobile banking or user's credit card
Usage	Less simple because of more complicated user interface and more functions	Simple because all functions have been simplified
Platform used	Web stores	Web stores (mobile version/web app), hybrid app, native app
Cost	Less costly for the creation a web store and the use of internet	More costly for the creation of a mobile app and the use of cellular data

7.3 Applications of M-Commerce

The general m-commerce applications are:

1. Mobile ticketing
Tickets can be sent to mobile phones using a variety of technologies. Users are then able to use their tickets immediately by presenting their phones at the venue.
Tickets can be booked and cancelled on the mobile with the help of simple application downloads or by accessing WAP portals of various Travel agents or direct service providers.
Mobile ticketing for airports, ballparks, and train stations, for example, will not only streamline unexpected metropolitan traffic surges, but also help users remotely secure parking spots (even while in their vehicles) and greatly facilitate mass surveillance at transport hubs.

2. Mobile vouchers, coupons and loyalty cards
Mobile ticketing technology can also be used for the distribution of vouchers, coupons and loyalty cards. The voucher, coupon, or loyalty card is represented by a virtual token that is sent to the mobile phone. Presenting a mobile phone with one of these tokens at the point of sale allows the customer to receive the same benefits as another customer who has a loyalty card or other paper coupon/voucher. Mobile delivery enables:
- economy of scale
- quicker and easier delivery
- effective target marketing
- privacy-friendly data mining on consumer behaviour

   ▪ environment-friendly and resources-saving efficacy

3. Content purchase and delivery

Currently, mobile content purchase and delivery mainly consists of the sale of ring-tones, wallpapers, and games for mobile phones. The convergence of mobile phones, mp3 players and video players into a single device will result in an increase in the purchase and delivery of full-length music tracks and video. Download speeds, if increased to 4G levels, will make it possible to buy a movie on a mobile device in a couple of seconds, while on the go.

4. Location-based services

Unlike a home PC, the location of the mobile phone user is an important piece of information used during mobile commerce transactions. Knowing the location of the user allows for location based services such as:
   ▪ local maps
   ▪ local offers
   ▪ local weather
   ▪ people tracking and monitoring

5. Information services

A wide variety of information services can be delivered to mobile phone users in much the same way as it is delivered to PCs. These services include:
   ▪ news services
   ▪ stock data
   ▪ sports results
   ▪ financial records
   ▪ traffic data and information

Particularly, more customized traffic information, based on users' travel patterns, will be multicast on a differentiated basis, instead of broadcasting the same news and data to all Users. This type of multicasting will be suited for more bandwidth-intensive mobile equipment.

6. Mobile Banking

Banks and other financial institutions are exploring the use of mobile commerce to allow their customers to not only access account information, but also make transactions, e.g. purchasing stocks, remitting money, via mobile phones and other mobile equipment. This service is often referred to as Mobile Banking or M-Banking. More negative issues like ID theft, phishing and pharming are lurking when it comes to mobile banking, particularly done on the mobile web. Net security technology free from redundancy and paradigm shifts away from mobile web-based banking will be an optimal solution to mobile banking in the near future.

7. Mobile brokerage

Stock market services offered via mobile devices have also become more popular and are known as Mobile Brokerage. They allow the subscriber to react to market developments in a timely fashion and irrespective of their physical location.

8. Auctions

Over the past three years Mobile reverse action solutions have grown in popularity. Unlike traditional auctions, the reverse auction (or low-bid auction) bills the consumer's phone each

time they place a bid. Many mobile PSMS commerce solutions rely on a one-time purchase or one-time subscription; however, reverse auctions are high return applications as they allow the consumer to transact over a long period of time.

9. Mobile purchase

Mobile purchase allows customers to shop online at any time in any location. Customers can browse and order products while using a cheap, secure payment method. Instead of using paper catalogues, retailers can send customers a list of products that the customer would be interested in, directly to their mobile device or consumers can visit a mobile version of a retailer's ecommerce site. Additionally, retailers will also be able to track customers at all times and notify them of discounts at local stores that the customer would be interested in.

10. Mobile marketing and advertising

Mobile marketing is an emerging concept, but the speed with which it's growing its roots is remarkable. Mobile marketing is highly responsive sort of marketing campaign, especially from brands' experience point of view. And almost all brands are getting higher campaign response rates. Corporations are now using m-commerce to expand everything from services to marketing and advertisement. Although there are currently very few regulations on the use and abuses of mobile commerce, this will change in the next few years. With the increased use of m-commerce comes increased security. Cell phone companies are now spending more money to protect their customers and their information from online intrusions and hackers.

Technologies of M-commerce:

1. **GPRS (General Packet Radio System):** GPRS is a non-voice service that allows speedy transmission of data. It is a packet-switched technology, which means that the data to be sent is broken up into small packets, which are "routed by the network resources is optimized as the resources are needed only during the handling of each packet.

   Advantages of GPRS:

   i) **Speedy:** By using all eight time-slots simultaneously GPRS can theoretically achieve transmission rates of up to 115.2 kbps, about two times faster than ISDN and ten times faster than other circuit switched GSM standard.

   ii) **Immediacy:** GPRS enabled mobile devices are, subject to network coverage of the geographic area, always connected to the network ("Always-on, Always connected" feature). The user does not have to dial up a connection to receive information.

   iii) **Innovative services:** GPRS can offer services that were not possible due to low transmission rates. It facilitates creation of WAP – pages similar to internet based web-pages and provides access to many other services, for example, the Internet, email, music and office applications.

   iv) **Costs advantage:** The subscriber pays for the volume of the transmitted data and not the time required to the process.

2. **TDMA (Time Division Multiple Access):** It is a digital transport that divides range assign to it into the series of channel and each channel is divided into time slot. Each conversation within that channel affects that time slot. It is use in Global system for mobile communication (GSM).

3. **CDMA (Code Division Multiple Access):** In CDMA, a transmitter assign a unique code to each wireless connection and then broadcast its data on the channel simultaneously with all other connection. The receiver is able to decode its conversation by knowing the unique code assign to each connection.

4. **GSM (Global System for Mobile communication):** Using an all digital TDMA based network, every GSM phone has access to a variety of data function with the speed of 9600 bits per second. These services include direct connect internet access (circuit switching as well as packet switching) without requiring a modem. Its basic features are:

   - A broad offer on voice and data communication services.
   - Compatibility with fixed-line networks, e.g. Analog and integrated service digital networks (ISDN) due to standardized interfaces.
   - Automatic roaming and handover procedures.
   - Support for various types of mobile devices, e.g. hand-held devices and devices mounted in vehicles.
   - Independent of device manufacturers.

Different generations of wireless communication:

0G

0G, also known as Mobile radio telephone, are the systems that preceded modern cellular mobile telephony technology.

1G

1G (or 1-G) refers to the first generation of wireless telephone technology (mobile telecommunications). These are the analog telecommunications standards that were introduced in the 1980s and continued until being replaced by 2G digital telecommunications. The main difference between the two mobile telephone systems (1G and 2G), is that the radio signals used by 1G networks are analog, while 2G networks are digital.

2G

2G (or 2-G) provide three primary benefits over their predecessors: phone conversations were digitally encrypted; 2G systems were significantly more efficient on the spectrum allowing for far greater mobile phone penetration levels; and 2G introduced data services for mobile, starting with SMS text messages. 2G technologies enabled the various mobile phone networks to provide the services such as text messages, picture messages and MMS (multimedia messages).

All text messages sent over 2G are digitally encrypted, allowing for the transfer of data in such a way that only the intended receiver can receive and read it.
Second generation 2G cellular telecom networks were commercially launched on the GSM standard in Finland by Radiolinja (now part of Elisa Oyj) in 1991.

3G

3G technology provide an information transfer rate of at least 200 kbit/s. Later 3G releases, often denoted 3.5G and 3.75G, also provide mobile broadband access of severalMbit/s to smartphones and mobile modems in laptop computers. This ensures it can be applied to wireless voice telephony, mobile Internet access, fixed wireless Internet access, video calls and mobile TV technologies.

A new generation of cellular standards has appeared approximately every tenth year since 1G systems were introduced in 1981/1982. Each generation is characterized by new frequency bands, higher data rates and non–backward-compatible transmission technology. The first 3G networks were introduced in 1998 and fourth generation 4G networks in 2008.

3.5G

3.5G is a grouping of disparate mobile telephony and data technologies designed to provide better performance than 3G systems, as an interim step towards deployment of full4G capability. The technology includes:

- High-Speed Downlink Packet Access
- 3GPP Long Term Evolution, precursor of LTE Advanced
- Evolved HSPA

4G

4G provides, in addition to the usual voice and other services of 3G, mobile broadband Internet access, for example to laptops with wireless modems, to smartphones, and to other mobile devices. Potential and current applications include amended mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing, 3D television, and cloud computing.

4.5G

4.5G provides better performance than 4G systems, as an interim step towards deployment of full 5G capability. The technology includes:

- LTE Advanced
- MIMO

5G

5G denotes the next major phase of mobile telecommunications standards beyond the current 4G/IMT-Advanced standards.

NGMN Alliance or Next Generation Mobile Networks Alliance define 5G network requirements as:

- Data rates of several tens of Mb/s should be supported for tens of thousands of users.
- 1 Gbit/s to be offered, simultaneously to tens of workers on the same office floor.
- Several hundreds of thousands of simultaneous connections to be supported for massive sensor deployments.
- Spectral efficiency should be significantly enhanced compared to 4G.
- Coverage should be improved.
- Signalling efficiency enhanced.
- Latency should be significantly reduced compared to LTE.

Next Generation Mobile Networks Alliance feel that 5G should be rolled out by 2020 to meet business and consumer demands. In addition to simply providing faster speeds, they predict that 5G networks will also need to meet the needs of new use-cases such as the Internet of Things as well as broadcast-like services and lifeline communications in times of disaster.

Wi-Fi:

The term Wi-Fi suggests Wireless Fidelity. It is hardware and software devices. It is wireless technology and network connecting device. Wi-Fi is not a technical term. The technical term of Wi-Fi is "IEEE 802.11". The term Wi-Fi, first used commercially in august 1999. Wi-Fi networks have limited range. A typical wireless router with a stock antenna might have a range of 32 meter indoors and 95 meter outdoors. Nowadays Wi-Fi is used in many personal

computers, video game consoles, MP3 players, smart phones, printers, digital cameras laptop computers and other devices. Wi-Fi is used to create wireless LAN to connect computer system.

Bluetooth:

Bluetooth is a wireless technology standard for exchanging data over short distances from fixed and mobile devices. Bluetooth is used to create personal area networks (PANs) with high levels of security. Bluetooth was created by telecoms vendor Ericsson in 1994.

The - End