Chapter-1- **Overview of E-commerce**

1. 1.   E-commerce and E-business

E-commerce can be defined in various ways. One definition can be the exchange or buying and selling of commodities; especially, the exchange of merchandise, on a large scale, between different places or communities.

Electronic commerce (e-commerce) is a general term for any type of business, or commercial transaction that involves the transfer of information across the Internet. This covers a range of different types of businesses from consumer-based retail sites, like Amazon.com, through auction and music sites like eBay or MP3.com, to business exchanges trading goods or services between corporations.

In most of the times it is defined as: ... the trading between products and services using networks such as the Internet. It draws on technologies such as

- Mobile commerce,

- supply chain management,

- Internet marketing,

- online transaction processing,

- electronic data interchange (EDI),

- Electronic Mail (e-mail)

- Electronic Bulletin Boards

- Electronic Fund Transfer (EFT)

- Inventory management systems, and

- automated data collection systems

Modern electronic commerce typically uses WWW for at least one of its transaction types.

E-commerce business may employ some or all of the following:

- Online shopping websites

- Business-to-business buying and selling

- Gathering and using demographic data through web contacts and social media

- Business-to-business electronic data interchange

E-business is a more general term than e-commerce. But, e-commerce focuses on the exchange of products and services between businesses, groups, individuals, and can be seen as part of any business. They involve transactions that cross firm boundaries, but E-businesses primarily focus on the application of digital technologies on business process within the firm.

Following is a table to summarize e-commerce and e-business:

E-Business:	E-Commerce:
• It's a continuous process right from initiation of sale offer to after sale customer caring. • Customer educating, Internet marketing and Business Research are done effectively • Uses internet for all its business activities	• It's a conclusion to a sale or a purchase activity through internet banking or credit card gateway • It's an activity just done by website that accepts debit/credit cards and internet purchasing • It is the domain of E-Business

Three primary processes are enhanced in e-business:

- Production processes which include procurement, ordering and replenishment of stocks, processing of payments, and electronic links with suppliers, production control processes.

- Customer-focused processes which include promotional and marketing efforts, selling over the Internet, processing of customers purchase orders and payments, and customer support.

- Internal management processes which include employee services, training, internal information-sharing, video conferencing, and recruiting. Electronic applications enhance information flow between production and sales forces to improve sales force productivity. Workgroup communications and electronic publishing of internal business information are likewise made more efficient.

1. 2. Features of E-commerce Technology

In its simplest form, e-commerce allows your company's product catalogue to be hosted on a web server so that customers and potential customers can visit your site, see what you have to sell and then place orders. The majority of e-commerce sites that sell to general consumers ask you to pay for the items you want using a credit card, and so they present forms that can safely and securely capture this information, and perform automatic credit card authorization/ transaction without human intervention.

The e-commerce process works as follows:
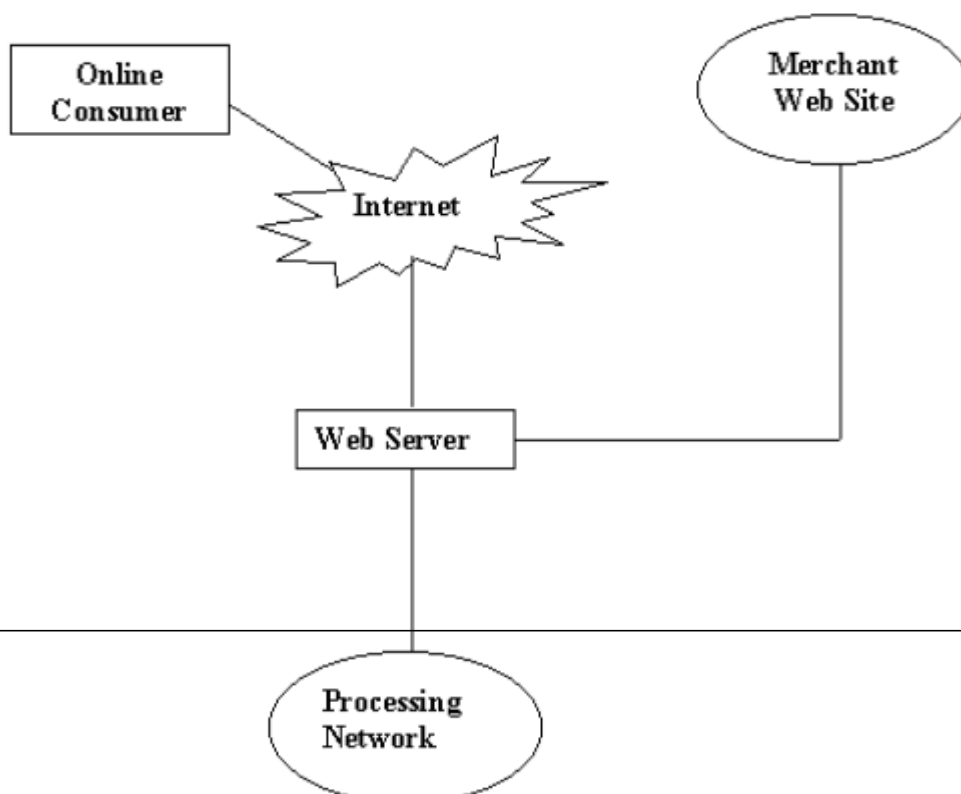
How it works:

I) A consumer uses Web browser to connect to the home page of a merchant's Web site on the Internet.

II) The consumer browses the catalogue of products featured on the site and selects items to purchase. The selected items are placed in the electronic equivalent shopping cart.

III) When the consumer is ready to complete the purchase of selected items , he/she provides a bill-to and ship-to address for purchase and delivery

IV) When the merchant's Web server receives this information, it computes the total cost of the order--including tax, shipping, and handling charges and then displays the total to the customer.

V) The customer can now provide payment information , such as a credit card number , and then submit the order

VI) When the credit card number is validated and the order is completed at the e-Commerce Server site, the merchant's site displays a receipt confirming the customer's purchase.

VII) The e-Commerce Server site then forwards the order to a Processing Network for payment processing and fulfilment.

1. 3. Traditional Versus Electronic Commerce

Although the goals and objectives of both e-commerce and traditional commerce are the same—selling products and services to generate profits—they do it quite differently. In e-commerce, the Web and telecommunications technologies play a major role. In e-commerce there may be no physical store, and in most cases the buyer and seller do not see each other.

Following is a summary of comparison of traditional commerce with e-commerce:

Activity:	Traditional commerce:	E-commerce:
Product information	Magazines, flyers	Web sites and Online catalogues
Business communications	Communication/transaction is done in synchronous way. Manual intervention is required for each communication or transaction e.g. Regular mail, phone	Communication or transaction can be done in asynchronous way. Electronics system automatically handles when to pass communication to required person or do the transactions. e.g. E-mail
Check product availability	Phone, fax, letter	E-mail, web sites, and extranets
standardization	It is difficult to establish and maintain standard practices in traditional commerce.	A uniform strategy can be easily established and maintained in e-commerce.
Order generation	Printed forms	E-mail, web sites
Invoice generation	Printed forms	Web sites

1. 4.   Advantages and Disadvantages of E-Commerce

The Internet has markedly changed the way we do business, whether it's finding new streams of revenue, acquiring new customers, or managing a business's supply chain. Ecommerce is mainstream — enabling businesses to sell products and services to consumers on a global basis. As such, e-commerce is the platform upon which new methods to sell and to distribute innovative products and services electronically are tested. The Web's influence on the world's economy is truly astonishing. The business world knows that the Web is one of the best ways for business such as manufacturers to sell their products directly to the public.

E-commerce has the following advantages:

- Electronic commerce can increase sales and decrease costs.

- Using e-commerce, organizations can expand their market to national and international markets with minimum capital investment. An organization can easily locate more customers, best suppliers, and suitable business partners across the globe.

- To provide better customer services

- E-commerce helps organizations to reduce the cost to create process, distribute, retrieve and manage the paper based information by digitizing the information.

- Advertising done well on the Web can get even a small firm's promotional message out to potential customers in every country in the world.

- The Web is particularly useful in creating virtual communities that become ideal target markets for specific types of products or services.

- A virtual community is a gathering of people who share a common interest, but instead of this gathering occurring in the physical world, it takes place on the Internet.

- Business can be transacted 24 hours a day

- A customer can put review comments about a product and can see what others are buying, or see the review comments of other customers before making a final purchase

- The level of detail of purchase information is selected by user

- Digital products can be delivered instantly

- Tax refunds, public retirement and welfare support costs less when distributed over the Internet

- E-commerce helps the government to deliver public services such as healthcare, education, social services at a reduced cost and in an improved manner

- Allows products and services to be available in remote areas, e.g. remote learning

However, e-commerce has the following disadvantages:

- Difficulty of integrating existing databases and transaction processing software designed for traditional commerce into the software that enables e-commerce

- The software development industry is still evolving and keeps changing rapidly

- There could be software/hardware compatibility issues, as some e-commerce software may be incompatible with some operating system or any other component.

- The business may face cultural and legal obstacles to conducting electronic commerce

- The trouble in recruiting and retaining employees with the technological design and business process skills needed to create an effective electronic commerce

- Users may not trust the site being an unknown faceless seller. Such mistrust makes it difficult to convince traditional users to switch from physical stores to online/virtual stores.

- It is difficult to ensure the security or privacy on online transactions

- Lack of touch or feel of products during online shopping is a drawback

Following are some reasons why companies need to build e-commerce enabled websites:

- **Low Entry Cost**: A company can establish itself on the Internet, and open for business, with a relatively small investment. Thousands of companies operate simple, inexpensive sites that are successful in their markets.

- **Reduces Transaction Costs**: dealing with customers over the web, weather to process orders or to attend to customer support, is cheaper than traditional marketing methods. For example, Dell Computer Corporation estimates that it saves eight dollars each time a customer checks the status of an order at the Dell Web site, instead of calling the company.

- **Access to the global market**: With a traditional business, the target market may be the local community or, with a higher advertising budget, it may extend to neighbouring communities. The Web extends the reach of even the smallest businesses by allowing them to market products globally. In effect all e-commerce businesses have become virtual multinational corporations.

- **Online distribution**: The Web enables businesses to distribute data and software online. 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 dialling.

- **Secure market share**: Getting a business online protects its current offline market share from being eroded by an online entrepreneur. If a business enters the e-commerce market too late, competitors who have already established a Web presence may make a successful market entry more difficult.

The consumer can be benefited from e-commerce in the following ways:

- **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.

- **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.

- **Price comparisons**: Customers can 'shop' around the world and conduct comparisons either directly by visiting different sites, or by visiting a single site where prices are aggregated from a number of providers and compared.

There are several basic steps you will need e-Commerce Enabled.

- Getting a Merchant Bank Account

- Web Hosting

- Web Design Considerations

- Registering a Domain Name

- Obtaining a Digital Certificate

1. 5. **Key Factors of E-Commerce**

The advancement of e-commerce in a country is determined by a number of key factors. Some of these are listed below:

- **Technological factors** – The degree of advancement of the telecommunications infrastructure which provides access to the new technology for business and consumers. A robust and reliable Internet infrastructure with a pricing structure that doesn't penalize consumers for spending time on and buying goods over the Internet (e.g., a flat monthly charge for both ISP access and local phone calls).

- **Transaction partners** – One partner are Banks. Banking institutions that offer transaction clearing services (e.g., processing credit card payments and electronic fund transfers) are very important. Also National and international freight companies to enable the movement of physical goods within around and out of the country are needed. For business-to-consumer transactions, the system must offer a means for cost-efficient transport of small packages (such that purchasing books over the Internet, for example, is not prohibitively more expensive than buying from a local store). Also authentication authority that serves as a trusted third party to ensure the integrity and security of transactions is important.

- **Political factors** – including the role of government in creating government legislation, initiatives and funding to support the use and development of e-

commerce and information technology. Government has to establish legal framework governing e-commerce transactions (including electronic documents, signatures, and the like) and Legal institutions that would enforce the legal framework (i.e., laws and regulations) and protect consumers and businesses from fraud, among others.

- **Social factors** – incorporating the level and advancement in IT education and training which will enable both potential buyers and the workforce to understand and use the new technology

- **Economic factors** – including the general wealth and commercial health of the nation and the elements that contribute to it.

1. 6. Limitations of E-commerce

There are limitations to e-commerce. These are dealt with according to organizations, consumers, and the society.

Limitations to the organization:

- 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.

- Rapidly evolving and changing technology, so there is always a feeling of trying to catch up and not be left behind. Under pressure to innovate and develop business models to exploit the new opportunities which sometimes leads to strategies damaging 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.

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

- 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 to the consumer:

- Computing equipment is needed for individuals to participate in the new digital economy, which means an initial capital cost to customers. A basic technical knowledge is required of both computing equipment and navigation of the Internet and the World Wide Web.

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

- 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.

- 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.

- A lack of trust because they are interacting with faceless computers

Limitations to the society:

- Breakdown in human interaction. As people become more used to interacting electronically there could be an erosion 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.

- 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. 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.

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

- 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.

1. 7. Major Service Types and Categories of E-Commerce

E-commerce can provide one or more of the following service types:

- **Electronic market**: Present a range of offerings available in a market segment so that the purchaser can compare the prices of the offerings and make a purchase decision. Example: Airline Booking System

- **Electronic Data Interchange (EDI)**:
  - o It provides a standardized system
  - o Coding trade transactions
  - o Communicated from one computer to another without the need for printed orders and invoices & delays & errors in paper handling
  - o It is used by organizations that make a large number of regular transactions

Example: EDI is used in the large market chains for transactions with their suppliers

- **Internet Commerce:**

    o It is used to advertise & make sales of wide range of goods & services.

    o This application is for both business to business & business to consumer transactions.

Example: The purchase of goods that are then delivered by post or the booking of tickets that can be picked up by the clients when they arrive at the event
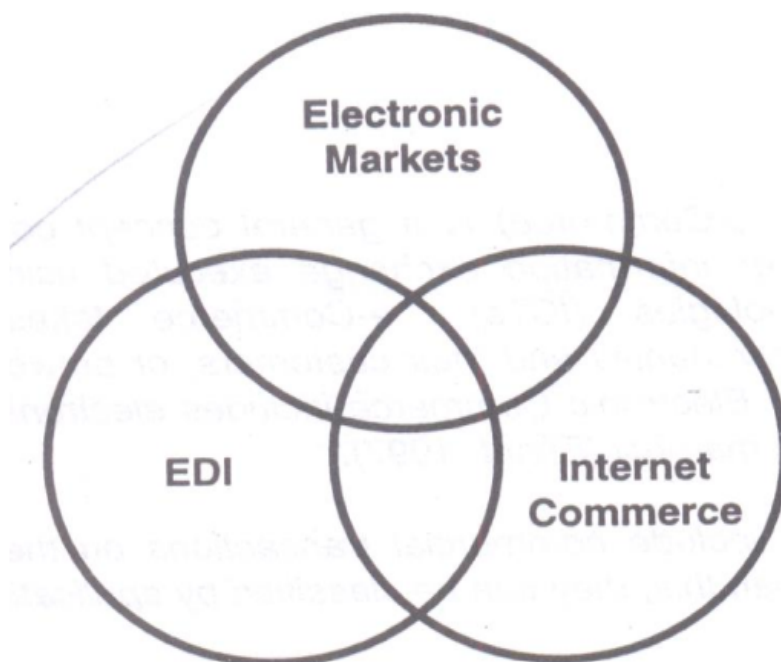
And following are some major categories of e-commerce:

- Business-to-consumer (B2C): Businesses sell products or services to individual consumers.

- Business-to-business (B2B): Businesses selling products or services to other businesses

- Business processes that support buying and selling activities: Businesses and other organizations maintain and use information to identify and evaluate

customers, suppliers, and employees which can be shared in the buying and selling activities.

- Consumer-to-consumer (C2C): Participants in an online marketing can buy and sell goods and services each other. Example: **eBay.com**

- Business-to-government (B2G): Businesses can sell goods and services to government and government agency.

1. 8. Electronic Data Interchange, EDI Detailed

EDI is nothing but the transfer of data between different companies using networks, such as the Internet. As more and more companies get connected to the Internet, EDI is becoming increasingly important as an easy mechanism for companies to buy, sell, and trade information.

EDI refers to the electronic exchange of business information between two companies using a specific and structured format. The concept has been around since the 1970s and has traditionally been used to automate buyer-seller transactions such as invoices and purchase orders. But as more processes within a company become automated, EDI has expanded to areas such as inventory management and product distribution.

EDI occurs when one business transmits computer readable data in standard format to another business. The standard formats used in EDI contain the same information that businesses have always included in their standard paper invoices, purchase orders, and shipping documents. EDI relies on standards, or common methods of defining classes of business data, which allow computers to recognize what data belongs to what department in a company.

In the early days of EDI, many companies built in-house EDI standards, but as interest grew, industries started to agree on common standards, administered by standards organizations. These standards, which allow computers in different organizations to share information over privately built, closed networks known as value-added networks (VAN), led to the use of EDI for corporate purchasing.

The VANs use a traditional-store-and-forward concept of handling data. Both sides would have to have the same application software and the data would be

exchanged in an extremely rigorous format. In sectors such as retail, automotive, defence and heavy manufacturing, EDI was developed to integrate information across larger parts of an organization's value chain from design to maintenance so that manufacturers could share information with designers, maintenance and other partners and stakeholders. Before the widespread and commercial use of the Internet, the EDI system was very expensive to run mainly because of the high cost of the private networks.

Few important documents used in EDI include Invoices, Purchase orders, Shipping Requests, Acknowledgement, Business Correspondence letters, and Financial information letters.

Advantages of EDI:

Following are some advantages of EDI:

- Accelerates the order–invoice–payment cycle from days or weeks to hours or minutes

- Decreases paperwork

- Expands the organization customer base

- Improves

    o accuracy of information transfer,

    o customer service,

    o response and access to information,

    o communications,

    o Cost efficiency,

    o customer service,

    o the competitiveness of an organization,

    o the speed of transaction processing, and

    o the speed of information transfer

Disadvantages of EDI:

The disadvantages of EDI can be listed as follows:

- **Concentration of control**: EDI causes management to rely more heavily on computer systems and places control in the hands of fewer individuals, potentially increasing risk.

- **Data processing, application, and communications errors**: Errors in computer processing and communications systems may result in the transmission of incorrect trading information or the reporting of inaccurate information to management. Application errors or failures can also result in significant losses to trading partners.

- **Potential loss of management and audit trails**: In some cases, EDI transaction data may not be maintained for a long period of time. Without proper consideration of legal and auditing issues, the entity may not be able to provide adequate or appropriate evidence, in hard copy or on magnetic media, for the legal dispute to be resolved favourably or for the audit to be completed cost effectively. Backup of the transactions must be made and maintained to guard against this possible problem.

- **Reliance on third parties**: The organization will become more dependent on third parties to ensure security over transactions and continuity of processing. Also, EDI may share the same kinds of security threats associated with any electronic data communications and other e-commerce applications. A number of potential risks include the following:

  - Confidential information could be exposed to unauthorized third parties or competitors.

  - Third-party staff could introduce invalid and/or unauthorized transactions.

  - Transactions could be lost because of disruptions of data processing at third party network sites or en route to the recipient partner, causing business losses and inaccurate reporting.

- **Total systems dependence**: All EDI transactions entered by an entity could be corrupted if the EDI-related application became corrupted. If the errors

remained undetected, there could be an impact on cash flow, adverse publicity and loss of business confidence by customers and suppliers. Undetected errors in transactions received from trading partners could cause losses from inappropriate operating decisions.

- **Unauthorized transactions and fraud**: Increased access to computer systems can increase the opportunities to change an entity's computer records and those of its trading partners, enabling significant fraud to be committed. Where payment transactions are automatically generated by the system, payments can be manipulated or diverted, or they can be generated in error or at the wrong time intervals.

Chapter-2-   **The E-Commerce Business Models:**

The several categories of e-commerce in use today are classified based on the nature of the transactions, including business-to-consumer (B2C), business-to-business (B2B), consumer-to-consumer (C2C), consumer-to-business (C2B), non-business and government, and organizational (intra-business).
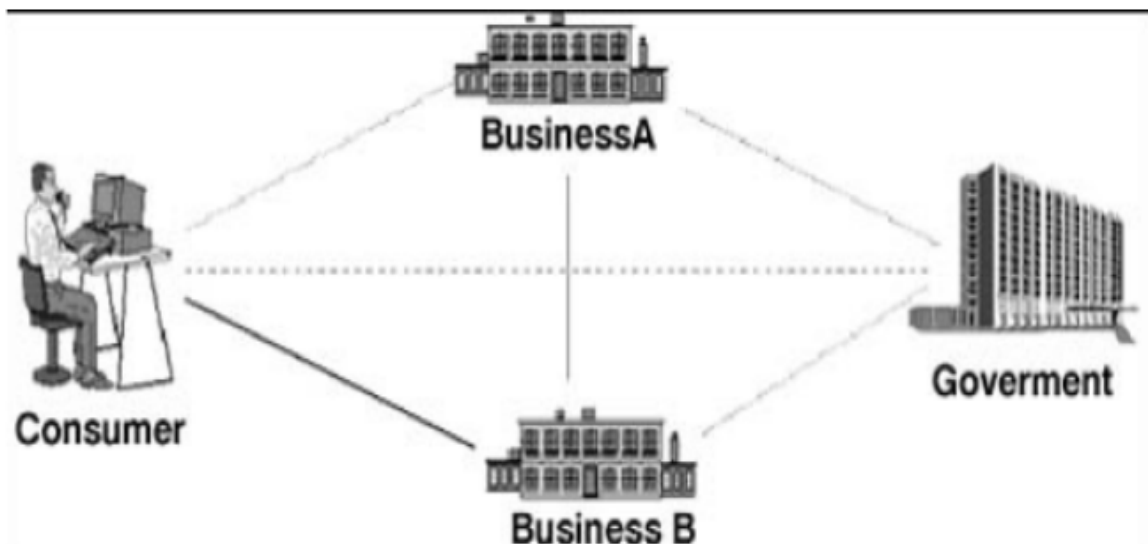
2. 1.   Business-to-Business (B-to-B) Models

- **Business-to-Business (B-to-B)**: The exchange of products, services or information between business entities.

  A website following the B2B business model sells its products to an intermediate buyer who then sells the product to the final customer. As an example, a wholesaler places an order from a company's website and after receiving the consignment, sells the end product to the final customer who comes to buy the product at one of its retail outlets.

  Web-based B-to-B includes:

  o Direct selling and support to business (as in the case of Cisco where customers can buy and also get technical support, downloads, patches online).

  o E-procurement (also known as industry portals) where a purchasing agent can shop for supplies from vendors, request proposals, and, in some cases, bid to make a purchase at a desired price. For example the auto-parts wholesaler (reliableautomotive.com).

  o Information sites provide information about a particular industry for its companies and their employees. These include specialized search sites and trade and industry standards organization sites. E.g. **newmarketmakers.com** is a leading portal for B-to-B news.

In a B2B environment, purchase orders, invoices, inventory status, shipping logistics, and business contracts handled directly through the network result in increased speed, reduced errors, and cost savings.

2. 2.   Business-to-consumer (B-to-C) Models

Business-to-consumer (B-to-C) is the exchange of products, information or services between business and consumers in a retailing relationship. Some of the first examples of B-to-C e-commerce were **amazon.com** and **dell.com** in the USA and **lastminute.com** in the UK.

In B2C e-commerce, businesses sell directly to consumers. Amazon.com is best example.

A website following the B2C business model sells its products directly to a customer. A customer can view the products shown on the website. The customer can choose a product and order the same. The website will then send a notification to the business organization via email and the organization will dispatch the product/goods to the customer.

2. 3. Business-to-Government (B-to-G) Models

Business-to-Government (B-to-G) is the exchange of information, services and products between business organizations and government agencies on-line.

This may include:

- E-procurement services, in which businesses learn about the purchasing needs of agencies and provide services.

- A virtual workplace in which a business and a government agency could coordinate the work on a contracted project by collaborating on-line to coordinate on-line meetings, review plans and manage progress.

- Rental of on-line applications and databases designed especially for use by government agencies.

2. 4. Consumer-to-Business (C-to-B) Models

Consumer-to-Business (C-to-B) involves individuals selling to businesses. This may include a service or product that a consumer is willing to sell. In other cases an individual may seek sellers of a product and service. Companies such as **priceline.com**, **travelbid.com**, and **mobshop.com** for travel arrangements are examples of C2B. Individuals offer certain prices for specific products and services.

In this model, a consumer approaches a website showing multiple business organizations for a particular service. The consumer places an estimate of amount he/she wants to spend for a particular service. For example, the comparison of interest rates of personal loan/car loan provided by various banks via websites. A
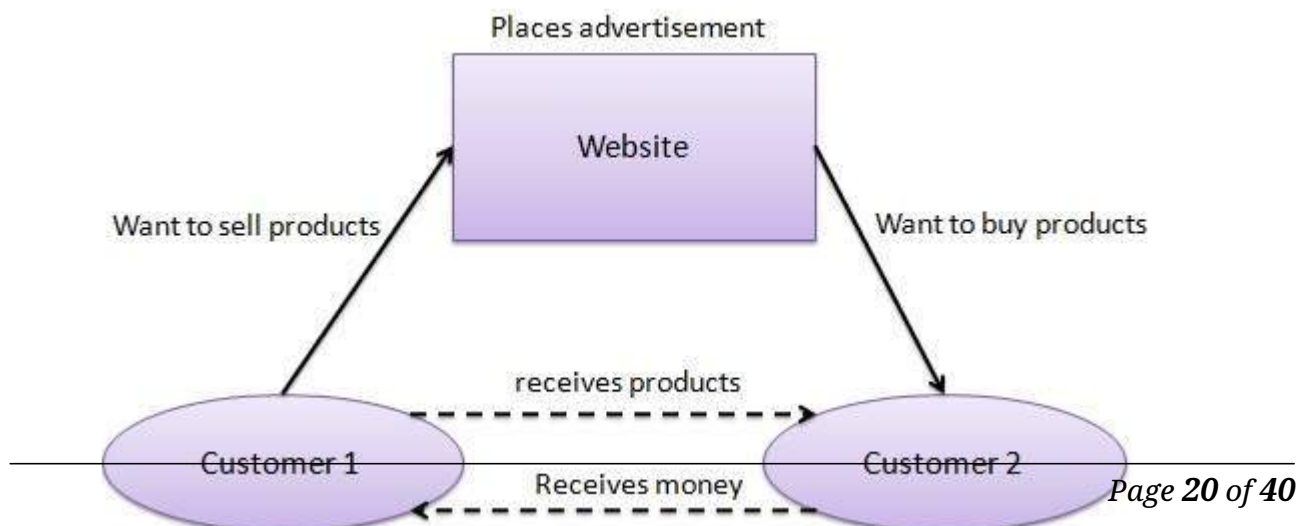
business organization that fulfils the consumer's requirement within the specified budget approaches the customer and provides its services.

2. 5.   **Consumer-to-Consumer (C-to-C) Models**

In this category, consumers interact directly with other consumers. They exchange information such as:

- Expert knowledge where one person asks a question about anything and gets an e-mail reply from the community of other individuals.

- Opinions about companies and products

A website following the C2C business model helps consumers to sell their assets like residential property, cars, motorcycles, etc., or rent a room by publishing their information on the website. Website may or may not charge the consumer for its services. Another consumer may opt to buy the product of the first customer by viewing the post/advertisement on the website.

Places advertisement

Website

Want to sell products

Want to buy products

receives products

Customer 1

Customer 2

Receives money

2. 6.   Government-to-Business (G-to-B) Models

Government-to-Business (G-to-B): The exchange of information, services and products between government agencies and business organizations. Government sites now enable the exchange between government and business of:

- Information, guidance and advice for business on international trading, sources of funding and support, facilities.

- A database of laws, regulations and government policy for industry sectors

- On-line application and submission of official forms (such as company and value added tax)

- On-line payment facilities

This improves accuracy, increases speed and reduces costs.

Chapter-3-   E-Commerce Software Building Blocks

3. 1.   E-Commerce Technology Concepts

Internet:

The Internet has revolutionized the computer and communications world like nothing before. The invention of the telegraph, telephone, radio, and computer set

the stage for this unprecedented integration of capabilities. The Internet is at once a worldwide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location.

The Internet represents one of the most successful examples of the benefits of sustained investment and commitment to research and development of information infrastructure. Beginning with the early research in packet switching, the government, industry and academia have been partners in evolving and deploying this exciting new technology.

The Web:

The web is one of the most effective methods to access and collect internet information because of its visual format and advanced features. Web application programs can also access many of the other internet services, such as Gopher, Usenet news, and file transfer, remote connectivity, can provide special access to data on the local intranet, such as database access, and can even customize programs for one's own needs. The web can be used as a complete presentation media for a company's corporate information or information on its products and services.

Web Servers:

Web servers run on different types of hardware/software servers. The web server can be grouped into UNIX servers, Windows NT servers, VMS servers, Macintosh servers, OS/2 servers, and Windows 3.1 servers. A web server is a program that offers a service that can be reached over the network.

An executive program is a client when it sends a request to a server and waits for a response. Conversely, a client can request services from many different servers. Common World Wide Web clients (browsers) available commercially include Explorer and Mozilla. The web clients can make requests of web servers and also other servers such as Gopher, FTP, news and mail servers.

New, innovative ideas have been developed around the web. For example, the weather reports have been available on the internet for years; when the web

became available, local and national, weather forecasts became available with a click of button on a map of area. Other ideas include a food delivery service through an online menu; an office scheduling program for a large department; a technical support program where comments are mailed to the technical support staff and return calls are made directly by telephone or answered by e-mail; and a variety of electronic magazines and periodicals.

In comparison to the ease and speed with which users can shop in virtual malls, paying for their purchases with a traditional credit card transaction or a check will increasingly appear to slow and cumbersome. Several innovators have recognized the need for "network cash", and have developed systems that make it easy for buyers and sellers to settle their accounts. Although internet users may view marketing and advertising information online, and even make a purchase decision based on that information, until deployment or SET, purchase transactions are primarily conducted over the telephone or fax machine for these reasons.

Browsers:

Browsers are sometimes also called web clients since they get information from a server. A web browser or Internet browser is a software application for retrieving, presenting, and traversing information resources on the World Wide Web. An information resource is identified by a Uniform Resource Identifier (URI) and may be a web page, image, video, or other piece of content. Hyperlinks present in resources enable users to easily navigate their browsers to related resources.

Although browsers are primarily intended to access the World Wide Web, they can also be used to access information provided by Web servers in private networks or files in file systems. Some browsers can also be used to save information resources to file systems.

The primary purpose of a web browser is to bring information resources to the user. This process begins when the user inputs a Uniform Resource Identifier (URI), for example **http://en.wikipedia.org/**, into the browser. The prefix of the URI determines how the URI will be interpreted. The most commonly used kind of URI starts with http: and identifies a resource to be retrieved over the Hypertext Transfer Protocol (HTTP).

Many browsers also support a variety of other prefixes, such as:

- **https:** for HTTPS,

- **ftp:** for the File Transfer Protocol, and

- **file:** for local files.

Prefixes that the web browser cannot directly handle are often handed off to another application entirely. For example, **mailto:** URI's are usually passed to the user's default e-mail application and **news:** URI's are passed to the user's default newsgroup reader.

In the case of http, https, file, and others, once the resource has been retrieved the web browser will display it. HTML is passed to the browser's layout engine to be transformed from markup to an interactive document. Aside from HTML, web browsers can generally display any kind of content that can be part of a web page. Most browsers can display images, audio, video, and XML files, and often have plug-ins to support Flash applications and Java applets. Upon encountering a file of an unsupported type or a file that is set up to be downloaded rather than displayed, the browser prompts the user to save the file to disk.

Interactivity in a web page can also be supplied by JavaScript, which usually does not require a plug-in. JavaScript can be used along with other technologies to allow "live" interaction with the web page's server via AJAX. Information resources may contain hyperlinks to other information resources. Each link contains the URI of a resource to go to. When a link is clicked, the browser navigates to the resource indicated by the link's target URI, and the process of bringing content to the user begins again.

The browser's main components are:

- **The user interface** - this includes the address bar, back/forward button book-marking menu etc. Every part of the browser display except the main window where you see the requested page.

- **The browser engine** - rendering engine.

- **The rendering engine** - example if the requested content is HTML, it is responsible for parsing the HTML and CSS and displaying the parsed content on the screen.

- **Networking** - used for network calls, like HTTP requests. It has platform independent interface and underneath implementations for each platform.

- **UI Backend** - used for drawing basic widgets like combo boxes and windows. It exposes a generic interface that is not platform specific. Underneath it uses the operating system user interface method.

- **JavaScript Interpreter**: Used to parse and execute the JavaScript code.

- **Data Storage**: This is a persistence layer. The browser needs to save all sorts of data on the hard disk, for examples, cookies. The new HTML specification (HTML5) defines 'web database' which is a complete (although light) database in the browser.
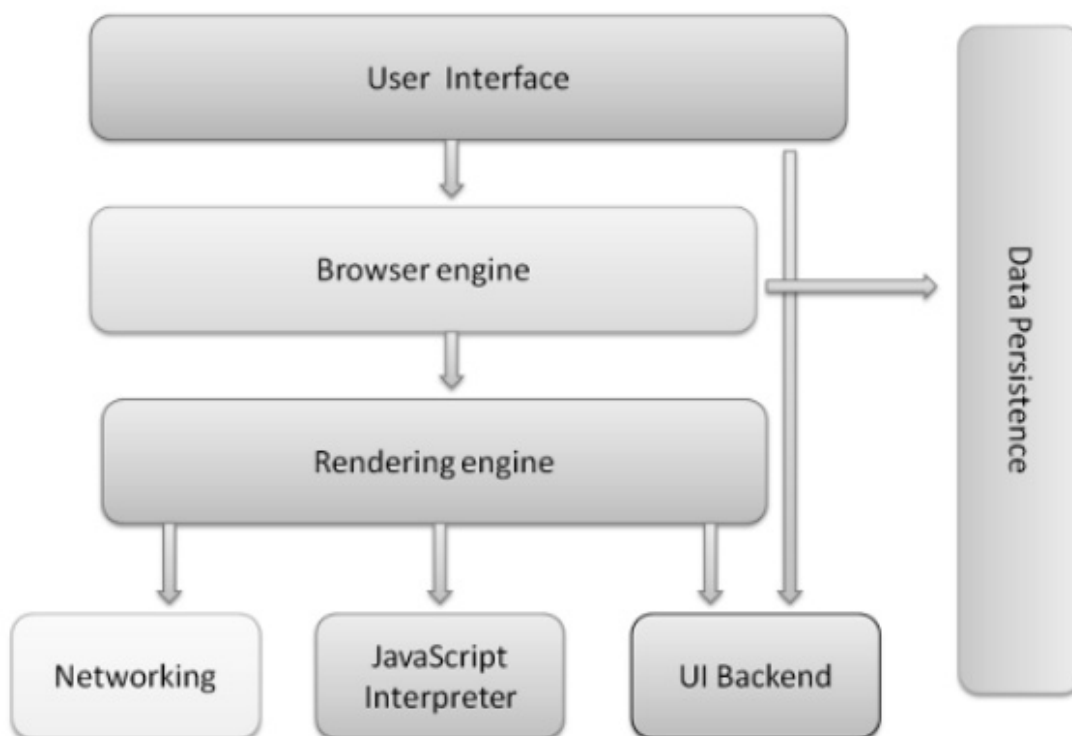
There are five major browsers used today. These are Internet Explorer, Firefox, Safari, Chrome and Opera.

3. 2. Internet Applications for E-commerce

The Internet has the ability to reach out to consumers globally as well as providing more convenient shopping to the consumer. If planned and executed correctly, the Internet can greatly improve sales. When user requests for any information, the system searches against information in a database and return the result as temporary, system-generated web pages for the end user to view.

Once a customer or subscriber inputs an order or subscribes through the company's web page order form, the customer can automatically be given access to another of the company's web pages, allowing the user to look up status information, search for documents and information, and download programs and files.

With customization, the company's web site can limit customers to different levels of services and hide information from them based on their granted security. In order to respond to requests and searches, the web server of the organizations needs online access to a database of information. This database would best be located on the web server or on a computer connected on network to the web server.

Web commerce can be made in mainly the following areas:

Direct Selling of Products and Services:

Many companies have begun selling their products directly on the web. The web's reach can transform a small company into a global distributor. Large corporations that already have their distribution networks in place often find the web to be a niche channel and many still think it is too early to be profitable. Some

believe the reason is that "Internet selling is too new", others believe that people are not certain, and changing behaviour takes some time. Smaller companies and so-called cyberpreneurs are moving faster and getting more substantive results.

Selling Advertising Space:

Selling banner advertising space is a great way to use your site's traffic to generate revenue, but it can be a bit tricky. The easiest option is to join a banner ad network, which will recruit advertisers, keep track of your earnings, and control banner ad placement on your site. In exchange for these services, the network will take a large percentage of the advertising money generated by your ad space.

Because there are more sites that want to sell advertising space than there are sites that want to buy advertisements, banner networks tend to be somewhat demanding about the publishers they recruit. Most banner networks set a minimum monthly traffic amount, which is often fairly high.

Many banner networks do cater to a range of sites, setting up different tiers to divide publisher sites based on monthly traffic. This is a good service for advertisers because it lets them choose the range of sites that best fits their budget and marketing campaign. Additionally, most banner networks put certain restrictions on publisher site content.

3. 3. Web Based E-commerce Architecture

Creating a website, any web developer wants it to be attractive, eye-catching and exclusive, that is why one may try to fill it up with various design elements which will make a dramatic impression on the viewer. However, making your web pages visually rich doesn't always appear to be a winning solution.

You must always remember that visitors come to your website not for an impression from flashing ads, widgets and other visual elements; they actually come for the content kept within your web pages with its idea, meaning and usefulness. That is why minimalist website will come in handy in case you need to make your visitors focus on your web pages rich content. However, there are several points to take into account while establishing a website with minimalist design.

- **Follow your purpose:** If you decided to stick to minimalism in your website design you need to remember that it requires implementing only necessary elements to get the most effective result. You should avoid complex techniques and heavy graphics - though they are very impressive that is not the main point of your minimalist website. Your customers will buy your items or subscribe to your services not because of interactive and amazing design but because your website will prove you are reliable and trustworthy partner.

- **Follow successful examples:** Searching a bit you will see that a lot of the most winning websites which get much traffic and income are also created in minimalist style. These websites may look simple but remain among the most rated on the web because they provide their customers with comfortable and fast browsing allowing finding what the clients are looking for easily. So take into account the experience of those who have gained recognition and popularity using minimum design and maximum usability and follow such examples

- **Make the navigation simple:** Instead of implementing complex interactive menus try to make your website navigation as simple & convenient as possible. Do not forget that your aim is to establish a good minimalist website which must provide your clients with most usability. That is why making your website navigation simple and comprehensible will be the most brilliant idea every visitor can't but appreciate.

- **Try to use HTML and CSS:** It is known that HTML and CSS techniques allow creating easy-to-use websites effectively. They will appear to be the most appropriate solution for your minimalist website and, moreover, do not require extra skills so you won't find it hard to use them even if you are not an experienced web developer. Moreover, avoiding simpler web development techniques will help you to avoid errors in website running and provides faster loading time which is very important for your minimalist website.

Chapter-4- **Ecommerce Security and Payment Systems**

4.1. **E-commerce Crime and Security Problems**

As business activity grows on the internet, security is becoming an important consideration to take into account and to address, to the stakeholder satisfaction.

In this context, security relates to three general areas:

- Secure file/information transfers

- Secure transactions

- Secure enterprise networks, when used to support web commerce

Computer security is one corner stone for the security of e-commerce. It has the following four fundamental goals:

- Privacy: keep private documents private, using encryption, passwords, and access-control systems.

- Integrity: data and applications should be safe from modification without the owner's consent.

- Authentication: ensure that the people using the computer are the authorized users of that system.

- Availability: the end system and data should be available when needed by the authorized user.

4.2. Security Threats in the E-commerce Environment

Ecommerce security is the protection of all the ecommerce assets of your company from unauthorized use. It is the implementation of measures to protect your online presence and store from hacks or any other cyber threat. It usually involves a series of protocols to secure the customer and the store. Some tips to improve ecommerce security include: adding a firewall, using robust passwords, and making use of Two-factor authentication, 2FA.

Two-factor authentication, most commonly abbreviated as 2FA, is a fantastic way to safeguard all of your online accounts against unwanted intruders. It relies on a second step — typically— to validate logins and verify that you are the owner of any given account.

There are quite a few threats you need to protect your online store from. Common examples of security threats include hacking, misuse of personal data, monetary theft, phishing attacks, unprotected provision of services, and credit card frauds.

Financial Frauds:

Financial fraud has afflicted online businesses since their inception. Hackers make unauthorized transactions and wipe out the trail costing businesses significant amounts of losses.

Credit card fraud happens when a cybercriminal uses stolen credit card data to buy products on your e-commerce store. Usually, in such cases, the shipping and billing addresses vary. You can detect and curb such activities on your store by installing an AVS – Address Verification System.

Another form of credit card fraud is when the fraudster steals your personal details and identity to enable them to get a credit card.

Some fraudsters also file requests for fake refunds or returns. Refund fraud is a common financial fraud where businesses refund illegally acquired products or damaged goods.

Spam:

Where emails are known as a strong medium for higher sales, it also remains one of the highly used mediums for spamming. Nonetheless, comments on your blog or contact forms are also an open invitation for online spammers where they leave infected links in order to harm you. They often send them via social media inbox and wait for you to click on such messages. Moreover, spamming not only affects your website's security, but it also damages your website speed too.

Phishing:

It is one of the common security threats of ecommerce where hackers pretence as legitimate businesses and send emails to your clients to trick them into revealing their sensitive information by simply presenting them with a fake copy of your legitimate website or anything that allows the customer to believe the request is coming from the business.

Common phishing techniques include emailing your customers or your team with fake "you must take this action" messages. This technique only works your customers follow through with the action and provide them access to their login information or other personal data which the hacker can exploit as per his benefit.

Bots:

You may recognize bots from your good books such as those that crawl the web and help you rank your website in Search Engine Result Pages. However, there are exclusive bots developed to scrape websites for their pricing and inventory information. The hackers use such information to change the pricing of your online store, or to garner the best-selling inventory in shopping carts, resulting in a decline in sales and revenue.

DDoS Attacks:

Distributed Denial of Service (DDoS) attacks and DOS (Denial of Service) attacks aim to disrupt your website and affect overall sales. These attacks flood your servers with numerous requests until they succumb to them and your website crashes.

Brute Force Attacks:

These attacks target your online store's admin panel in an attempt to figure out your password by brute-force. It uses programs that establish a connection to your website and use every possible combination to crack your password. You can protect yourself against such attacks by using a strong, complex password. Do remember to change it regularly.

SQL Injections:

SQL injections are cyber-attacks intended to access your database by targeting your query submission forms. They inject malicious code in your database, collect the data and then delete it later on.

Trojan Horses:

Admins and customers might have Trojan Horses downloaded on their systems. It is one amongst the worst network security threats where attackers use these programs to swipe sensitive information from their computers with ease.

4.3. E-Commerce Payment Systems

E-commerce sites use electronic payment, where electronic payment refers to paperless monetary transactions. Electronic payment has revolutionized the business processing by reducing the paperwork, transaction costs, and labour cost. Being user friendly and less time-consuming than manual processing, it helps business organization to expand its market reach/expansion. Listed below are some of the modes of electronic payments −

- Credit Card

- Debit Card

- Smart Card

- E-Money

- Electronic Fund Transfer (EFT)

Credit Card:

Payment using credit card is one of most common mode of electronic payment. Credit card is small plastic card with a unique number attached with an account. It has also a magnetic strip embedded in it which is used to read credit card via card readers. When a customer purchases a product via credit card, credit card issuer bank pays on behalf of the customer and customer has a certain time period after which he/she can pay the credit card bill. It is usually credit card monthly payment cycle. Following are the actors in the credit card system.

- The card holder – Customer

- The merchant – seller of product who can accept credit card payments.

- The card issuer bank – card holder's bank

- The acquirer bank – the merchant's bank

- The card brand – for example, visa or Mastercard.

Debit Card:

Debit card, like credit card, is a small plastic card with a unique number mapped with the bank account number. It is required to have a bank account before getting a debit card from the bank.

Smart Card

Smart card is again similar to a credit card or a debit card in appearance, but it has a small microprocessor chip embedded in it. It has the capacity to store a customer's work-related and/or personal information. Smart cards are also used to store money and the amount gets deducted after every transaction.

Smart cards can only be accessed using a PIN that every customer is assigned with. Smart cards are secure, as they store information in encrypted format and are less expensive/provide faster processing.

E-Money

E-Money transactions refer to situation where payment is done over the network and the amount gets transferred from one financial body to another financial body without any involvement of a middleman. E-money transactions are faster, convenient, and save a lot of time.

Online payments done via credit cards, debit cards, or smart cards are examples of e-money transactions. Another popular example is e-cash. In case of e-cash, both customer and merchant have to sign up with the bank or company issuing e-cash.

Electronic Fund Transfer

It is a very popular electronic payment method to transfer money from one bank account to another bank account. Accounts can be in the same bank or different banks. Fund transfer can be done using ATM (Automated Teller Machine) or using a computer.

Nowadays, internet-based EFT is getting popular. In this case, a customer uses the website provided by the bank, logs in to the bank's website and registers another bank account. He/she then places a request to transfer certain amount to that account. Customer's bank transfers the amount to other account if it is in the same bank, otherwise the transfer request is forwarded to an ACH (Automated Clearing House) to transfer the amount to other account and the amount is deducted from the customer's account. Once the amount is transferred to other account, the customer is notified of the fund transfer by the bank.

4.4. Limitations of Online Credit Card Payment Systems

Many companies have catalogues of their goods and services available on WWW home pages, but they do not support Web-based interactive ordering. An increasing number of early adopter companies, however, do allow interactive ordering of their goods by implementing secure credit card payments over the Internet. The advantage to this integrated approach is that it further automates the ordering

process. However, so far, only a limited number of Web servers and browsers support transactional security with back-end clearance of credit cards and other payment issues.

The problem with making electronic Web payments is that the Internet is not a private network to which only a very limited and controlled population has access. Because the Internet is a public network, electronic transactions can in principle be intercepted and read by other servers on the network. Hackers can pick off logins and passwords.

Security is an essential part of any transaction that takes place over the internet. Customers will lose his/her faith in e-business if its security is compromised.

Following are the essential requirements for safe e-payments/transactions −

- **Confidentiality** − Information should not be accessible to an unauthorized person. It should not be intercepted during the transmission.
- **Integrity** − Information should not be altered during its transmission over the network.
- **Availability** − Information should be available wherever and whenever required within a time limit specified.
- **Authenticity** − There should be a mechanism to authenticate a user before giving him/her an access to the required information.
- **Non-Repudiability** − It is the protection against the denial of order or denial of payment. Once a sender sends a message, the sender should not be able to deny sending the message. Similarly, the recipient of message should not be able to deny the receipt.
- **Encryption** − It is a very effective and practical way to safeguard the data being transmitted over the network. Sender of the information encrypts the data using a secret code and only the specified receiver can decrypt the data using the same or a different secret code.
- **Auditability** − Data should be recorded in such a way that it can be audited for integrity requirements.

To satisfy those requirements, organizations may apply the following technologies:

- Secure Socket Layer (SSL)

- Secure HTTP digital signatures

- Public and private key secure electronic transmission (SET)

4.5. **Secure Socket Layer (SSL)**

SSL is a layer that exists between the raw TCP/IP protocol and the application layer. While the standard TCP/IP protocol simply sends an anonymous error-free stream of information between two computers (or between two processes running on the same computer), SSL adds numerous features to that stream, including:

- Authentication and non-repudiation of the server, using digital signatures

- Authentication and non-repudiation of the client, using digital signatures

- Data confidentiality through the use of encryption

- Data integrity through the use of message authentication codes

The SSL protocol introduced by Netscape Corporation provides a relatively secure method to encrypt data that are transmitted over a public network such as the Internet. SSL provides security for all Web transactions, including file transfer protocol (FTP), HTTP, and Telnet-based transactions. It provides an electronic wrapping around the transactions that go through the Internet. All the major web server vendors, including Microsoft and Netscape, support SSL. The open and non-proprietary nature of SSL is what makes it the preferred choice for TCP/IP application developers for securing sensitive data. Similar to any other security measure, SSL is not perfect. For example, the protocol is vulnerable to attacks on the SSL server authentication. Despite its vulnerabilities, when properly implemented, SSL can be a powerful tool for securing Web-sensitive data. SSL offers comprehensive security by offering authentication and encryption at the client and server sides.

4.6. **Digital Signature:**

Digital signature ensures the authenticity of the information. It is an e-signature authenticated through encryption and password.

A digital signature guarantees the authenticity of an electronic document or message in digital communication and uses encryption techniques to provide proof of original and unmodified documentation.

Digital signatures are used in e-commerce, software distribution, financial transactions and other situations that rely on forgery or tampering detection techniques.

A digital signature is also known as an electronic signature.

4.7. Secure Electronic Transaction (SET)

SET is a secure protocol developed by MasterCard and Visa in collaboration. It is used to facilitate the secure transmission of consumer card information via electronic portals on the Internet.

Theoretically, it is the best security protocol. It has the following components –

- Card Holder's Digital Wallet Software – Digital Wallet allows the card holder to make secure purchases online via point and click interface.
- Merchant Software – This software helps merchants to communicate with potential customers and financial institutions in a secure manner.
- Payment Gateway Server Software – Payment gateway provides automatic and standard payment process. It supports the process for merchant's certificate request.
- Certificate Authority Software – This software is used by financial institutions to issue digital certificates to card holders and merchants, and to enable them to register their account agreements for secure electronic commerce

The process of secure electronic transactions used digital certificates that were assigned to provide electronic access to funds, whether it was a credit line or bank account. Every time a purchase was made electronically, an encrypted digital certificate was generated for participants in the transaction–the customer, merchant, and financial institution–along with matching digital keys that allowed them to confirm the certificates of the other party and verify the transaction. The

algorithms used would ensure that only a party with the corresponding digital key would be able to confirm the transaction. As a result, a consumer's credit card or bank account information could be used to complete the transaction without revealing any of their personal details, such as their account numbers. Secure electronic transactions were meant to be a form of security against account theft, hacking, and other criminal actions.

Chapter-5- **Electronic Commerce: Legal, Ethical, and Tax Issues**

6.1. The Legal Environment of Electronic Commerce

6.2. Use and Protection of Intellectual Property in Online Business

6.3. Online Crime, Terrorism, and Warfare

6.4. Ethical Issues

Chapter 7: Frauds, Scams and Financial Euphoria

7.1. Straightforward dishonesty

Chapter 8: Online Auctions, Virtual Communities, and Web Portals

Chapter 9:Electronic Commerce Software:

9.3.	Electronic	Commerce	Software	for	Small
and Midsize Companies

9.4.	Electronic	Commerce	Software	for	Midsize
to Large Businesses

9.5. Web Site Development Tools