CHAPTER 1

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1.1 Definition and meaning of e-commerce

Definition: Sharing business information, maintaining business relationships and conducting business transactions using computers connected to a telecommunication network is called E-Commerce.

A more general definition of e-commerce is given by Wigand (1997) as:

The seamless application of information and communication technology from its point of origin to its endpoint along the entire value chain of business processes conducted electronically and designed to enable the accomplishment of a business goal. These procedures may be partial or complete or may encompass business to business as well as business to consumer and consumer to business transactions. E-commerce can be viewed as online business. It can mean selling data directly from the website or offering applications for download after they are purchased online.

E-commerce is a technology or a system; it also can be viewed as different kind of business. It is a business of computer and communication network which is depending upon the business transactions. E-commerce includes both business to business (B2B) and Business to customer (B2C) transactions.

Main objectives of e-commerce:

1) Reduced costs
2) Lower product cycle time
3) Faster customer response
4) Improved service quality

1.2 Comparison between e-commerce and e-business

The main difference between e-business and e-commerce is e-commerce is related with revenue, transactions in which money is involved. Whereas e-business may be related to internal process like inventory control processes which do not directly give you revenue for the company, Second major difference is e-business is inside the firm and e-commerce takes its place as the transactions related to the
outside firms with the firms are considered. Exchange of money changes the transactions of suppliers and customers from e-business to e-commerce. Still there is one similarity that is transactions are electronic or online. Both require same skill set.

E-commerce is used more by the service provider companies and data processing services. It is used less by other industries as well as security and investment companies, ISO 9000 companies will be using e-commerce in future. E-commerce is a very useful for business it allows buying and selling online with the use of World Wide Web and internet. E-mails, faxes and telephone are also used in e-commerce. It is not only the online shopping but it includes buying and downloading on the net plus maintaining stock and continuous transactions with customers and suppliers.

1.3 E-commerce System Design

The following table shows e-commerce system architecture in which there are total 6 layers and there services for each layer.

Table 1.1 E-commerce System Design: [4]

<table>
<thead>
<tr>
<th>LOGICAL LAYERS</th>
<th>SERVICES IN LAYER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middleman Services</td>
<td>Hosting services, value added nets, payment services, Certificates</td>
</tr>
<tr>
<td>Secure messaging</td>
<td>Encryption, EDI, Firewalls</td>
</tr>
<tr>
<td>World wide web services</td>
<td>HTTP, HTML, XML, OLE</td>
</tr>
<tr>
<td></td>
<td>Software agents</td>
</tr>
<tr>
<td>Logical Network</td>
<td>Intranet, internet, extranet</td>
</tr>
<tr>
<td>Physical network</td>
<td>PSTN, LAN, Bridges, routers,</td>
</tr>
</tbody>
</table>

1.4 International E-commerce growth

E-commerce growth is very high; people have started doing online shopping more than traditional shopping. The following table shows worldwide e-commerce growth in different countries. .
Table 1.2: International E-commerce growth [4]

<table>
<thead>
<tr>
<th></th>
<th>International E-commerce transactions ($)</th>
<th>% sales in 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
<td>2001</td>
</tr>
<tr>
<td>Total($billion)</td>
<td>657.0</td>
<td>1.233.6</td>
</tr>
<tr>
<td>North America</td>
<td>509.3</td>
<td>908.6</td>
</tr>
<tr>
<td>United states</td>
<td>488.7</td>
<td>864.1</td>
</tr>
<tr>
<td>Canada</td>
<td>27.4</td>
<td>38.0</td>
</tr>
<tr>
<td>Mexico</td>
<td>3.2</td>
<td>6.6</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>53.7</td>
<td>117.2</td>
</tr>
<tr>
<td>Japan</td>
<td>31.9</td>
<td>64.4</td>
</tr>
<tr>
<td>Australia</td>
<td>5.6</td>
<td>14.0</td>
</tr>
<tr>
<td>Korea</td>
<td>5.6</td>
<td>14.1</td>
</tr>
<tr>
<td>Western Europe</td>
<td>87.4</td>
<td>194.8</td>
</tr>
<tr>
<td>Germany</td>
<td>20.6</td>
<td>46.4</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>17.2</td>
<td>38.5</td>
</tr>
<tr>
<td>France</td>
<td>9.9</td>
<td>22.1</td>
</tr>
<tr>
<td>Italy</td>
<td>7.2</td>
<td>15.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>6.5</td>
<td>14.4</td>
</tr>
<tr>
<td>Latin America</td>
<td>3.6</td>
<td>6.8</td>
</tr>
</tbody>
</table>

The following figures of e-commerce sales of U.S. also reveal the fact that there is growth in e-commerce.

**U.S. E-commerce sales of the year 2011 [5]**

There is an increase in e-commerce sales per year. As given by the Census Bureau of the Department of Commerce U.S. retail e-commerce sales considering seasonal variations but not adjusted for price changes in third quarter of 2011 was $48.2 billion which showed increase of 1.9 percent compared to second quarter. Also there was an increase of 1.1 percent in total retail sales and its value was $1,052.7 billion. E-commerce total retail sales also increased to 8.2 percent and e-commerce estimate increased to 13.7 percent in the same third quarter.
Table 1.3: Estimated Quarterly U.S. Retail sales: Total and E-commerce
(Estimates are based on data from the monthly retail Trade Survey and administrative records)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Retail Sales (Millions of dollars)</th>
<th>E-commerce as % of total</th>
<th>Percent Charge From Prior Quarter</th>
<th>Percent Charge from Same Quarter A Year ago</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total E-com</td>
<td>Total E-com</td>
<td>Total E-com</td>
<td>Total E-com</td>
</tr>
<tr>
<td>Adjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd quarter 2011(p)</td>
<td>1,052,736</td>
<td>48,244</td>
<td>4.6</td>
<td>1.1</td>
</tr>
<tr>
<td>2nd quarter 2011(r)</td>
<td>1,041,406</td>
<td>47,352</td>
<td>4.5</td>
<td>1.1</td>
</tr>
<tr>
<td>1st Quarter 2011</td>
<td>1,029,575</td>
<td>46,131</td>
<td>4.5</td>
<td>2.6</td>
</tr>
<tr>
<td>4th quarter 2010</td>
<td>1,008,112</td>
<td>44,517</td>
<td>4.4</td>
<td>3.1</td>
</tr>
<tr>
<td>3rd Quarter 2010(r)</td>
<td>972,770</td>
<td>42,418</td>
<td>4.4</td>
<td>0.9</td>
</tr>
<tr>
<td>Not Adjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Quarter 2011(p)</td>
<td>1,049,067</td>
<td>44,495</td>
<td>4.2</td>
<td>-1.1</td>
</tr>
<tr>
<td>2nd Quarter 2011(r)</td>
<td>1,061,124</td>
<td>44,224</td>
<td>4.2</td>
<td>10.0</td>
</tr>
<tr>
<td>1st Quarter 2011</td>
<td>965,068</td>
<td>43,713</td>
<td>4.5</td>
<td>-8.3</td>
</tr>
<tr>
<td>4th Quarter 2010</td>
<td>1,051,917</td>
<td>53,225</td>
<td>5.1</td>
<td>8.4</td>
</tr>
<tr>
<td>3rd Quarter 2010</td>
<td>970,155</td>
<td>39,230</td>
<td>4.0</td>
<td>-0.9</td>
</tr>
</tbody>
</table>

An E-commerce sale of third quarter of 2011 was 4.6 percent of the total sales. Whereas U.S. e-commerce retail total sales for not adjusted basis was $44.5 billion. There was an increase of 13.4 percent estimate and 8.1 percent total retail sales from the third quarter of 2010 to 2011. An E-commerce sale in third quarter was 4.2 percent compared to total sales.

During e-commerce sales an order is placed online, terms and conditions are fixed on the net and negotiations are done on the net. Network can be internet; Electronic data interchange network, e-mail or any other online system while the payment is not necessarily online.

1.5 **Business, technology and society model of e-commerce**

The following table shows how e-commerce affects business, technology and society in different countries.
### Business
- In retailing business consumer e-commerce percentage is increasing.
- The online shopping rate is increasing.
- New business strategies and internet use has increased the profits of online sites.
- Many businesses have adopted online businesses. This includes books, music and air travel. In addition, eight businesses have changed into online business. These are television, telephones, jewelry, hotels, movies, bill payments, software and real estate.
- The main areas of e-commerce growth especially are travel, information clearing houses, entertainment, retailing, appliances and home furnishings.
- The sites like Amazon, eBay and proposals developed by big industries are used by small businesses and entrepreneurs.
- Incorporated Policies with multiple channels introduced by J.C. Penny, Sears, L.L. Bean and Wal-Mart are growing due to internet.
- Supply chain transactions in B2B and joint commerce is increasing; its growth is above $1.5 trillion mark.

### Technology
- There are changes in the technology; Wireless Internet connections like Wi-Fi, Wi-max and 3G telephone are replacing the old technology.
- New technology was developed for broadcasting for radio and user generated commentary.
- Use of internet broadband became popular in houses and businesses. Its costs were also reduced.
- Use of RSS (Really Simple Syndication) increased as a user controlled information distribution compared to e-mail in some applications.
- Prices of computer and network peripherals lowered.
- B2B transactions have increased due to .net and internet services.

### SOCIETY
- There is increase in Blogs, wikis and social networks as a separate publishing section.
- Newspapers and other traditional media became online with the use of interactive models.
- With the use of e-commerce inconsistencies in copyright management and control are increasing.
- Half of the internet users have joined social media group on internet.
- Internet sales taxation was accepted by large online merchants.
- Problems in content management and regulation controls increased.
- Internet communications was inspected more than before.
- Commercial and governmental privacy were taken care of more.
- Problems such as internet fraud and abuse cases increased.
- First Amendment rights of free speech and association on the internet are tested.
- Free speech spam is growing with the introduction of new technology.
- Marketers are adopting personal privacy on the web more and more.
1.6 Current Users of E-commerce in India[^6]

1) TATA MOTORS

E-commerce is used by TATA Motors for the management of Supply Chain Management on the Internet. This company is the largest commercial motor vehicle manufacturer from 1999. Company Group Tata Technologies Limited is also creating connections with backend ERP systems. The company has internet connections currently for three manufacturing units Pune, Jamshedpur and Lucknow and also head quarters in Mumbai. This company is also planning to make all its dealer contacts online. At the same time it also wants to bring passenger cars and commercial vehicle dealers online. It is also planning to create payment system in collaboration with banks.

2) Hindustan Lever

This company has a network of suppliers and 7500 distributors. Soon top retailers also will be added by the company in a network. Company plans to use internet for its transactions. E-tailing opportunities will be used by companies for its products and for bigger universal products. Its distribution system covers two million retail outlets and also company has plans to establish B2B and B2C businesses in the likely areas.

3) Financial Institutions, Banks

ICICI bank has online services to operate the bank account online. Some websites offer trade transactions online but the related tasks you have to do physically. ICICI bank offers online account to credit the shares and debit the money for completing the transaction. Electronic payment system is also provided by the bank. Using this system the biller can give his bills and customer can pay online. Hence the banks are related with the B2B and B2C markets.

1.7 Brief History of e-commerce[^4]

Even if exact date and time of first use of e-commerce is not known. There are many businesses which used e-commerce. In late 1970’s Baxter Healthcare, a pharmaceutical firm used e-commerce by using a telephone modem for reordering supplies from Baxter. This system was converted into PC based order entry
system. This system was used to a large extent before the invention of internet. Electronic Data Interchange (EDI).

E-commerce trend started in the year 1990. The beginning period was of upgrading and growth. Internet was first used in 1995 for advertising products.

E-commerce is a current trend of late 1990’s and it has small messy history. The beginning of e-commerce was of growth and upgrading. In the year 1995, web was used for advertising of products. E-commerce is a recent phenomenon of late 1990’s, it also has brief chaotic history. The early years were of growth and modernization. In 1995, web was first used to advertise products. Stock value of dot.com companies reached the highest and started decreasing in March 2000 due to this grown of e-commerce and web decreased. Actually, it was expected that e-commerce and web should be reevaluated in these days. But then the growth started improving strongly in the next years till today.

Many new dot companies from United States had highest financial capital of $125 billion. The following graph shows the capital investment by different firms in the period 1995-2005 from which 80% were internet related industries. Investment in dot companies was highest as compared to other industries. Even if total investment in dot com companies and internet is lowered the rate of investment has doubled in 2005 in comparison with the year 1995.

**Graph 1.1: Quarterly amounts rose by Venture Backed Firms**

![Graph showing quarterly amounts raised by venture-backed firms](image)

The quarterly amounts raised by venture-backed firms peaked during the 1999-2001 period but the amount raised in the 2002-2005 period is still higher than that raised in the periods prior to 1999.

In the year 2004 dot com IPOs were the toppers in business where as Google’s IPO’s stood second in the business and they earned $1.67 billion. Price of Google
shares increased from $85 to $300. In 2004-2005 shares of retailing companies had increase in share prizes by 80% compared to the year 2003.

It was concluded by the computer scientists and information technologists that the growth in E-commerce was due to the introduction of set of information Technologies which were developed in last forty years starting with internet up to the PC and till local area network. The objective of it was to provide a large amount of information to the people from different libraries, government and scientific institutes available on the websites which will be easy to obtain. Technologists viewed internet as a free and self controlled medium to access which will not be owned by any nation. Economists were of the opinion that e-commerce will the means to provide the business information of price, product and quality equally to form a perfect market which will be having global scope and customers can access worldwide information. Due to worldwide information access the search rates for prices, product information, settlement of payment and order execution would reduce. Search programs will be used for searching the required prices and quality in fewer prices while businesses will not require searching for customers and advertising the product. At the same time there will not be the requirement of wholesalers and distributors reducing the price of the product. Manufacturers would be directly in contact with customers. The worldwide tough competition, reduction in intermediaries and lower transaction costs would in turn reduce product bands and the profits due to it and due to the geography or due to special access to factors of production. Prices will reduce as it would include only the cost of production plus market rate and payment industrial effort which will be reduced later. Competitive advantages only for one competitor will not be there and hence the market would be called friction free commerce. This came as a dream to the entrepreneurs worldwide. Marketers and customers benefited due to inexpensive, universal and powerful market. The marketers also can divide the market depending on the needs of the customers, prices and brands required and the related sponsorships. Marketers who in the market earlier would be benefited more.
This would create a brand name, expanded customer base and would create a new channel and a website for the interface and the customers knowing switching prices. New technology for the online businesses would create informative and community features which will be difficult to copy. Once the user gets familiar with the interfaces and characteristics, he will not change to other merchandise easily. A website with different technologies and techniques will be created which will reach many customers increasing the value of the website. The firm will charge the fees to the customers for the used technology and will be profited more than other competitors.

1.8 WHY STUDY E-COMMERCE? [4]

1.8.1 Uses of e-commerce

Application of digital technologies to business processes within the firm is called E-business. These technologies have deep impact on commerce more than e-commerce. E-commerce technology is powerful than any other technology which has left economic effect on the world. The evolving internet and other technologies will shape up 21st century.

The traditional process of marketing and sales was a lengthy process of selling and advertising. Branding required long term product observation of the customers. Selling was done in well insulated channels in a traditional manner limited by social and geographical boundaries unable to search worldwide for the required price and quality. The information about the product was not available worldwide creating profitable information asymmetries. It was difficult to change the national or regional prices in traditional retailing. One national price was a norm and different regions had different prices for the same product. E-commerce has challenged this traditional thinking.

1.8.2 Seven Unique Features of E-Commerce Technology[7]

1) Ubiquity

It is available everywhere at any time. The result is called a market space—a marketplace extended beyond traditional boundaries and removed from a temporal and geographic location. It saves transaction cost and time. In traditional
commerce, you have to visit physically to a market place in contrast you don’t have to visit any where for e-commerce market.

2) Global Reach
Due to e-commerce technology commercial transactions has crossed all the cultural and national boundaries. The potential market size of e-commerce merchants is roughly equal to the world’s online population (over 1 billion in 2005). Where as traditional commerce can not cross national boundaries.

3) Universal Standards
Technical standard for conducting internet and hence e-commerce has become universal. They are shared by all the nations. While traditional technologies differ from one nation to the next. For the merchants market entry cost is same all over the world and it is lowered due to internet. For the customers price and product search is lowered. The prices are constant throughout the world and can be searched from any part of the world.

4) Richness
Information of any product is available easily. Traditional markets, national sales forces and the retail stores are able to provide the prompt audio and visual information very easily which makes it a powerful selling and commercial environment. The messages are spread evenly not depending on the distance. The richness of the message is spread evenly i.e. complexity and the content of the message are same throughout the world.

5) Interactivity
It allows two way communications between merchant and customer, No other commercial technology of the Twentieth century except telephone has this feature. E-commerce can be used for both giving and receiving the information from the net using different websites.

6) Information Density
The information available on the web is more accurate and reaches the person fast in a timely manner. The information is complete and is available to consumers, merchants and participants. In addition the information need not be stored and
processed; saving the storage, processing and communication cost. Consumer can easily find all the cost in the world.

7) Personalization/Customization
E-commerce technologies allow personalization by targeting their marketing message to a specific person by adjusting a message to person’s name, interests, and past purchases. The technology also permits customization by changing the product according to the user’s requirement. A lot of information about the customer’s requirement, its past purchases can be stored due to information density.

1.9 Scope of e-commerce. [2]

1.9.1 Parts of e-commerce
Basically e-commerce means commercial transactions on the net. Depending on the type of commercial transaction e-commerce is classified into different parts -

- Electronic Markets:
  It is mainly about searching for a particular product or service. Airline Reservation system is the biggest example of this type.

- Electronic Data Interchange (EDI):
  EDI is exchange of all the commercial documents between different commercial organizations. It is widely used by the retailers and vehicle assemblers when trading with their suppliers.

- Internet Commerce:
  It is generally used for once off trading transactions. It is used for advertising goods and services. It is used both for B2B and B2C transactions.

**Figure 1.1: Three Categories of E-commerce**
1.9.2 E-commerce and the trade cycle:

E-commerce can be applied to all phases of trade cycle. The values trade cycle depends upon:

- Type of the organization
- The frequency of transactions between the partners who want to exchange the goods
- The type of goods or services getting exchanged

The trade cycle supports following activities:

- **Presale activity - Search & negotiate Phase** - Searching the goods or services as per the requirement and agreeing the terms of trade
- **Execution and settlement Phase** – Execution phase includes placing the order and delivery of the product while settlement phase includes presenting invoice and making payment
- **After sales activities** - such as warrantee and service etc

There are various versions of the trade cycles depending upon the online factors above and for many transactions, further complicated by the complexities of international trade. Three general trade cycles are as follows:

- **Repeat trade cycle** – This are regular, repeat transactions between commercial trading partners for e.g. transactions between supplier and manufacturers. If the supplier supplies goods many times to the same manufacturer, these transactions are regular and repeat transactions.
- **Credit transactions** – These are irregular transactions between commercial trading partners where execution and settlement are separated. In this case the goods are taken on credit and the payment is done later which separates execution and settlement phase.
- **Cash transactions** – These are irregular transactions in once off trading relationships where execution and settlement are normally combined. In cash
transactions order, delivery and payment are combined i.e. carried out at the same time.

The trade cycle of these three categories are shown below –

**Figure 1.2: Repeat, credit and cash Trade Cycle**

<table>
<thead>
<tr>
<th>Cycle Trade</th>
<th>Repeat</th>
<th>Credit</th>
<th>cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search</td>
<td></td>
<td></td>
<td>Pre-sale</td>
</tr>
<tr>
<td>Negotiate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order</td>
<td></td>
<td></td>
<td>Execution</td>
</tr>
<tr>
<td>Deliver</td>
<td></td>
<td></td>
<td>Settlement</td>
</tr>
<tr>
<td>Invoice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After Sales</td>
<td></td>
<td></td>
<td>After Sales</td>
</tr>
</tbody>
</table>

1.9.3 **Electronic Market:**

It is a type of electronic market which has internal organizational information system which allows buyers and sellers to exchange information about prices and product. It is associated with the search phase of trade cycle. When the same product is sold by different organizations it becomes difficult to choose a product from a particular company. The benefits of e-market are it reduces the searching cost and increases the variety of products; Increasing the efficiency of the market. It also reduces the profit possibility of the suppliers and sellers.

Electronic market and electronic information is used for getting product and price information which is used in product exchanges, financial markets and in air line industry for booking air tickets. The search for the available ticket with the required date and time is done for the customer. If he seat is found the ticket is given and payment is done which is nothing but execution and settlement phase. If the ticket availability is not there then the process may stop after search phase.
only and the execution and settlement phase is not carried out. It may also be used by the intermediaries.

Travel agents are using Airline booking System for booking the air tickets. Malone predicted that the overall effect of this technology is to increase the proportion of economic activity synchronized by markets. It is observed that there is growth and use of market has increased in already working areas of e-commerce but in new areas there is no improvement.

1.10 Functions, advantages and disadvantages

1.10.1 Advantages of Electronic Commerce:

- The messages and important information can reach the world in no time which makes the process effective and cheap for suppliers and customers.
- An online store works 24 hours a day, 7 days a week, 365 days a year or via an EDI system.
- The cost required to set up an office is very high in comparison with the cost of setting a website which in turn can be integrated with less efforts.
- A website can be easily modified for the new products in comparison with catalogues and brochures.
- New market segments can be explored with the use of internet.
- Business processes are automated and with increased efficiencies as there is no need to re-key in orders into order entry system.
- Easy search of required quality product and wide choice and no wastage of time.
- Easy Buying/selling of items with the use of internet using a computer
- Use of financial and legal services, medical advice etc. from proper portals.
- No need of personal visit and searching, large variety of goods accessible easily without spending time and money

1.10.2 The major advantages to the business: [2]

- A website helps the business to reach out to worldwide customers at a very low cost.
- As all the documents are exchanged electronically, the business speed is increased with the reduction in order processing cost as manual data entry is greatly reduced.
• Reduction in transaction time reduces inventory size
• Fast funds transfer
• Use of search engines and e-mail correspondence makes it easy to find large number of potential business partners.
• As manufacturers can directly contact retailers, middleman such as retailer can be eliminated. E.g. Dell computers sells PCs in USA directly to customers) to reduce cost and delays.

1.10.3 Disadvantages of Electronic Commerce:[2]

• One psychological barrier is that customers can not touch and feel the product as the selling is online. This is removed when the customer becomes familiar.
• People don’t socialize much as people do not have to go to the market all the work is done on the computer with e-commerce and computer based technologies.
• Many companies do not know how to set up online store because there is a fear of dissatisfied and annoyed customers as the customers do not know whom to contact. In addition online stores do not exist for very long.
• Use of computer systems is not safe as money transactions are intercepted by hackers. Both the customers and companies are harmed.
• The use of internet is limited with only young and highly educated man using internet. Women and elderly people do not use internet and hence can not be the customers for the internet based business.
• In India internet is not available in small villages.
• Payment by credit card is not trusted. Customers do not trust vendors to give their credit card number as the vendors are online and are unknown to the customer.
• For the increase of B2B e-commerce, EDI standards need to be updated. Small businesses will not be able to follow these standards.
• Social contacts by the customers will be totally stopped as the customers need not have to go to the market. Testing the product by touch and feel will no more exist resulting in not knowing the quality of the item.
• One of the problems is of security on the net. Credit card transactions are not safe, hackers can steal the credit card number if care is not taken.
• Hackers attack shopping portals. One of these problems is rejection of service on the portal. This happens because a large number of enquiries are made on the portal, which makes it inaccessible to the legitimate customers.

• Portals have to be protected from viral attacks and other electronic damage and surveillance by special security system.

1.10.4 Functions of Electronic Commerce:[2]

The four functions of e-commerce are:

Communication 2) Process management 3) Service management 4) Transaction capabilities process effective and cheap for suppliers and customers.

Figure 1.3: Four main Functions of E-commerce

<table>
<thead>
<tr>
<th>Functions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Functions</td>
<td>It is related with exchange of information or documents for carrying out business transactions. E.g. E-mail</td>
</tr>
<tr>
<td>Process Management Function</td>
<td>It includes computerization and improvement of business processes. e.g. Connecting two computers in networking to share and transfer data instead of manually copying information from one computer to another.</td>
</tr>
<tr>
<td>Service Management Function</td>
<td>This is related with applying technology to improve the quality of service. E.g. Federal Express website. It allows customers to follow shipment and schedule picks up 24 hours a day with a world wide network automatically without taking the help of service representative. Customer service is improved because of sites</td>
</tr>
<tr>
<td>Transaction Capabilities</td>
<td>It allows buying and selling on the internet or allows to carry out any online service. E.g. Retail website of Amazon.com and REI</td>
</tr>
</tbody>
</table>

1.11 Electronic Commerce Systems:

- Online point of sale (POS) transaction processing
- Web retailing and wholesaling
- EDI (Electronic Data Interchange)
- EFT (Electronic Fund Transfer)
- Electronic Banking
- Interactive marketing
- SCM (Supply Chain Management)
1.12 **E-commerce Technologies Used:**[2]

- **Electronic Data Interchange (EDI)**
  
  Computer to computer exchange of structured information in a standard electronic format

- **Bar Codes**
  
  For automatic product identification by the computer Bar codes and bar code scanners are used as a direct data entry device. The bar code scanner reads bar information. It is made up of bars of different widths and spacing that gives alphabetic and numeric information about products or addresses. The bar code information is converted to electronic form which is then processed by a computer. Bar codes are scanned with hand held rod or a built in scanner. There are different types of barcodes in use.

- **E-mails**
  
  - Digital form of messages which are written on computer and sent and received in the digital form on the internet using email id of the person.

- **Internet**

- **World wide web**

- **Product data exchange**

- **Electronic forms**
  
  - A digital, analogue image appearing on the computer screen which looks exactly like a form.

1.13 **Business models of e-commerce**

1.13.1 **Principal business models**

Principal business based on the transacting partners: E-commerce is categorized on the basis of the partners directly involved in the transaction. The following table shows different categories based on following models –

<table>
<thead>
<tr>
<th>Principal business models</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Business to business known as B2B</td>
<td></td>
</tr>
<tr>
<td>Business to consumer known as B2C</td>
<td></td>
</tr>
</tbody>
</table>
- Consumer to business known as C2B
- Consumer to consumer known as C2C
- Mobile e-commerce

Table 1.4: Business models of E-commerce

<table>
<thead>
<tr>
<th>TRANSACTION ORIGINATING FROM AND BEING FULFILLED BY</th>
<th>Business</th>
<th>Consumer</th>
<th>Government</th>
<th>Peer</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRANSACTION INITIATED &amp; ACCEPTED BY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>B-to-B</td>
<td>B-to-C</td>
<td>B-to-G</td>
<td>B-to-P</td>
</tr>
<tr>
<td>Consumer</td>
<td>C-to-B</td>
<td>C-to-C</td>
<td>C-to-G</td>
<td>C-to-P</td>
</tr>
<tr>
<td>Government</td>
<td>G-to-B</td>
<td>G-to-C</td>
<td>G-to-G</td>
<td>G-to-P</td>
</tr>
<tr>
<td>Peer</td>
<td>P-to-B</td>
<td>P-to-C</td>
<td>P-to-G</td>
<td>P-to-P</td>
</tr>
</tbody>
</table>

Each principal business model has its own advantages for the business and customer through the characteristics such as:
- The nature of delivery
- Customization
- Seller characteristics
- Price setting mechanism

1.13.2 Business to Business (B2B):[8]

As the name suggests these transactions are between the companies or the businesses including wholesale purchases of services, resources, technology, manufactured parts and components, and capital equipment. It also includes financial transactions such as insurance, commercial credit, bonds, securities and other financial assets. B2B e-commerce refers to the substitution of computer data processing and Internet communications for labor services in the production of economic transactions. Some companies act as intermediaries or middleman between the companies buying and selling goods and services.

B2B business is widely spread difficult to know. According to Jupiter Communications report the total transaction of goods excluding services between businesses in the United States was expected to reach up to $11.5 trillion in 2000, out of that $336 billions are conducted electronically. In 2005, this figure was expected to reach $6.3 trillion out of total of $15.1 trillion. Goldman Sachs in the
year 2000 predicted that B2B business worldwide was expected to grow up to $4.5 trillion by 2005. The Gartner Group reports $90 billion B2B transactions in comparison with $16.7 billion B2C transactions using internet including brokerage fees for online financial trading as well as retail sales of goods. Expected Production requirements from B2B are divided into four parts: efficiency of automation of transaction, economical growth of new market intermediaries, merging of demand and supply in categorized exchanges and increase in the rate of vertical integration of companies.

**Figure 1.4: Public switched Telephone Network**

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Web-based B-to-B includes:

- **Direct selling and support to business** (for example Cisco company) customers can buy as well as can do downloads, patches online, get technical support.

- **E-procurement** (also known as industry portals) in which all the works related to purchasing is done by the purchasing agent of the company. He can request for proposals from suppliers and can offer to make purchase at the desired price. For example the auto parts wholesaler (reliableautomotive.com); and the chemical B-to-B exchange (chemconnect.com).

- **Information sites** These are the sites giving information about a particular industry for its companies and their employees. This site can be a search site or a trade and industry standards organization site. E.g. newmarketmakers.com is a leading portal for B-to-B news. This sites help in automatic exchange of information by saving transaction cost and time. E-commerce can be one of the best tool to integrate your business if it forms a part of the
supply chain. B2B ecommerce is growing rapidly. It is used to get serious work done to link suppliers, factories, distributors and retailers directly. B2B e-commerce is efficient to reduce time and cost in the tedious and time consuming tasks. While B2C is used to advertise and sale the product. E.g. Amazon.com B2B involves only the firm’s business/trading partners. This includes –

1) Suppliers
2) Distributors
3) Dealers
4) Vendors

The entire commerce cycle is included in B2B:

- From awareness to product research
- Supplier sourcing
- Transactions
- Selection
- Fulfillment
- Post sales support

Business to business transactions are also known as marketing transactions. This includes:

- Use of EDI and Electronic mail for purchasing goods and services.
- Buying information and consultancy services
- Submitting requests for proposals.
- Receiving proposals.

80% of the Business-to-Business transactions by internet are for the following purposes-

- ordering parts and supplies
- confirming receipts of deliveries
- taking orders and confirming their shipment
- communications with remote offices and contractors (ex. advertising firm)
- tracking inventories
• monitoring of remote activities (building sensors, fuel consumption)
• Stock sales etc.

These transactions would account for $3 trillion/year worldwide and is still increasing. This results in replacement of human travel and paper documents by electronic information exchange which in turn results in dematerialization.

**Other benefits:**
• orders in accurate amount
• orders just in time results in reduction in warehousing
• Improved control of inventories resulting in reduction in energy use and land
• Enhanced quality logistics resulting in less transportation

1.13.3 Business –consumer category:

With the growth of the World Wide Web B2C has expanded greatly. There are now shopping malls over the internet which supplies all types of goods from audio CDs to computers. Amazon.com and rediff.com are the examples of this type of business. E-commerce gives the product list supplied by the supplier to the customer. The supplier can sit in the office or home for providing the list. The needs of the customers are fulfilled by customizing products and prices using e-commerce also the queries and problems of the customers are sorted fast from the dealers within few seconds. Efficiency of organizations or value chains is improved using e-commerce. Prompt response and no redundancy results in reduced costs and reduced prices.

**Business-to-consumer (B-to-C):** It is the exchange of products, information or services between business and consumers in a retailing relationship. The examples of these are amazon.com and dell.com in and lastminute.com in the UK. Here B stands for business and the C stands for either consumer or customer.
Figure 1.5: B2C Business Model

<table>
<thead>
<tr>
<th>Table 1.5: LIMITATIONS ON THE GROWTH OF B2C E-COMMERCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIMITING FACTOR</td>
</tr>
<tr>
<td>Expensive Technology</td>
</tr>
<tr>
<td>Sophisticated Skill set</td>
</tr>
<tr>
<td>Persistent cultural attraction of physical markets and traditional shopping experiences</td>
</tr>
<tr>
<td>Persistent global inequality limiting access to telephones and personal computers</td>
</tr>
</tbody>
</table>

1.13.4 Business-to-Government (B-to-G): Online exchange of information, services and products between business organizations and government agencies. This may include,
1) **E-procurement services**, It is a service which makes businesses learn about the purchasing needs of agencies and provide services.

2) **A virtual workplace** in which a business and a government agency make coordination to do the work online on a contracted project by arranging on-line meetings, review plans and manage progress.

3) **Hiring of on-line applications and databases** designed especially for use by government agencies.

**1.13.5 Consumer-to-Business (C-to-B):** This is the exchange of products, information or services from individuals to business. A typical example of this is, individuals selling their services to businesses.

**Figure 1.6: C2B Model**

![Image of C2B Model](image)

**1.13.6 Consumer-to-Consumer (C-to-C):**

The C2C model means transaction between consumers. In C2C category consumer sells directly to another consumer. For example EBay and www.bazee.com are online auction Web sites that provide a consumer to advertise and sell their products online to another consumer.

Here, it is necessary that both the seller and the buyer must register with the auction site. Buyer does not need to pay any amount but the seller has to pay the auction house to sell their products. Buyer and seller meet on the site to conduct deals.
In C2C consumers there is an interaction of consumers directly with other consumers. They exchange information which is of different types -

- **Expert knowledge** There are inquiries from the people and answer is given to the goods of other individuals. For example New York Times joined to abuzz.com website.

- **Opinions are given by customers about companies and products for example epinions.com. Some sites like e-bay and swapitshop.com offer individuals to exchange goods with each other without exchange of money.**

### 1.13.7 Other Business Models of e-commerce

**Business-to-Peer Networks (B-to-P):** This would be the requirement of hardware, software or other services to the peer networks. An example of this is Napster which provides software and facilities to do peer networking.

**Consumer-to-Government (C-to-G):** This type of category does not exist as no consumer has provided service to government yet.

**Consumer-to-Peer Networks (C-to-P):** This is like a peer-to-peer networking is and so is not needed as consumers use their computing facilities while using the peer network.

**Government-to-Business (G-to-B):** This is related with exchange of information, services and products between government agencies and business organizations. There are many government sites now which allow the exchange between government and businesses such as -

- International Business Information, guidance and advice for international business facilities (e.g. [www.dti.org.uk](http://www.dti.org.uk)) and sources of money and support (ukishelp),
● A database of industry laws, regulations and government policies.
● Official forms of on-line application and submission (for e.g. company tax, value added tax).
● On-line payment services.

Application of G-to-B improves accuracy, increases speed and reduces costs. Financial incentives are provided for electronic form submission and payment services.

**Government-to-Consumer (G-to-C):** (Also known as e-government). This are the government sites which provide people with information, forms and facilities to conduct transactions using which user can pay bills and submit official forms like tax returns online.

**Government-to-Consumer (G2C) model:** In this model, the government contacts with the consumers. By using G2C model tax payments laws can be applied on the consumers by the government over the internet.

**Consumer-to-Government (C2G) model:** In this model, an individual consumer interacts with the government. For example, income tax or house tax payment online by the individual. As the consumer contacts with government, this type of transaction falls under C2G model.

**Government-to-Government (G-to-G):** (Also known as e-government). These are the type of transactions between two governments within countries connecting local governments as well as international governments, within European Union, which is the development at the beginning to join different national systems. For example, transactions like buying of oil from Arabian government by American government where there is a transaction between two governments.

**Government-to-Peer Network (G-to-P):** No example of this type is in existence till now.

**Peer-to-Peer Network (P-to-P):** This type of networking exists with parties having same capabilities; any party can start a communication session. Internet is used to exchange files and computer resources directly or through a mediating service in recent peer to peer application. Peer to peer technology does not need central web server and any other type of intermediaries to exchange files and
computer resources over internet. However P2P technology uses super servers as intermediaries to speed up the process. Since 1999, Business enterprise capitalists and entrepreneurs are using various aspects of peer to peer technology into Peer to peer (P2P) e-commerce. There are many successful applications of P2P only the exception is of illegal downloading of copyrighted music. In the year 2001, a website named Napster.com was created which offered to share online music files was the well known example of peer-to-peer e-commerce but it was put out of business because of series of negative court decisions. Two more websites with the names Kazaa and Grokster were having a similar website but they were also subjected to legal challenge. In the year 2002 Recording Industry of America a trade organization of the largest recording companies filed a case against Kazaa and Grokster for violating copyright law. The company was blamed for enabling and encouraging member to exchange copyrighted music tracks without paying to the owner. In June 2005, in one case, the Supreme Court issued a decision against the file sharing networks.

**Peer Network-to-Consumer (P-to-C):** These are nothing but the peer to peer networking services offered to different consumers who are the basic part of peer network.

**Peer Network-to-Government (P-to-G):** This type is not used till now but if it is used in future it would be like P-to-B but instead of business, the transaction is with government.

**Peer Network-to-Business (P-to-B):** This type of networking provides resources to business. For example, the tasks requiring high capacity processing power such as the spare processing capacity of individual machines on the network to solve mathematical problems or intensive and repetitive DNA analyses are done using peer network resources. This model was used to divide the customers into different categories and to find the needs, requirements, business processes and services of different customer.

**Mobile commerce** or **m-commerce:** This model is concerned with the wireless digital devices to carry out transactions using web. M-commerce uses wireless networks to connect cell phones and handheld devices such as blackberries. These
networks also connect personal computers. Mobile consumers after connection can conduct transactions including stock trades, in-store price comparisons, banking, travel reservations, etc. M-commerce is mostly used in Japan and Europe (especially in Scandinavia), than in United States where cell phones are used more. Thus far, m-commerce is used most widely in Japan and Europe, especially in Scandinavia, where cell phones are more common than in the United States. But it is expected that m-commerce will grow rapidly in United States within next five years.

1.14 The barriers to E-commerce

CommerceNet20 (a non-profit consortium of business, technology, academic and government leaders who develop and implement e-commerce technology and business practice) have conducted an annual survey of visitors to the Commerce Net website, to identify the barriers to e-commerce. They are as follows –

- **Internet infrastructure** is concerned with problems such as accessibility and quality of the Internet in terms of speed and consistency. This barrier is a major fear and should be looked carefully by SMEs and B-to-C organizations.

- **Technology infrastructure** It is related with the problems in system standardization and applications in case of larger organizations which should be implemented such as value chain integration and e-supply chain management.

- **Security** is the main barrier of e-commerce Identified as Security and Encryption; Trust and Risk; User Authentication and Lack of Public Key Infrastructure; Fraud and Risk of Loss. It is a main problem for companies in the B-to-C e-commerce retail sector, since it shows the worries and views of users and probable customers doing financial transactions on-line.

- **Issues of organizational structure and culture** are most significant for large organizations that have to deal with change management issues. For e.g. there is a feeling that a lot of work needs to be done for designing correct organizational structure and corporate culture and will enhance the benefits of widespread e-commerce applications.
• **Commercial infrastructure** This is related with the problems of taxation laws, international trade agreements and other legal agreements. These problems are related to all kinds of online trading transactions. Hence is a barrier to all kinds of trading transactions.

• **Lack of qualified personnel** This is a barrier which should implemented in house and third party e-commerce systems. In case of SME’s this is a main problem which should be looked after as they are not having enough resources to retain their own staff which will develop complicated technology infrastructure.

• **Lack of proven business models** is one barrier which results in insecurity and poor performance dot coms on the world’s stock exchanges in late 1999 and early 2000 after the shaky heights to which dot com companies rose in 1998–9.

• **Interoperability of systems** is a major barriers for large US-based B-to-B corporations. This is a problem of implementing and making the systems compatible with the existing legacy systems with new e-commerce applications and also relating resources within organizations.

1.15 **E-commerce Implementation**[10]

E-commerce implementation is divided into two parts:

1) Technical Implementation:

Technological implementation is dependant upon the factors such as -1) objective of business 2) requirements of the business 3) selected technologies for the business.

Technical implementation depends upon business objectives, requirements and the technologies which are selected. Different E-commerce systems are combined together instead of designing them newly.

• The end users operating the system – Here the problem of computer literacy comes into picture as new system requires many computer literate people.

• The functionality of the system should be according to the users needs. It should not be like how organization thinks.

• The problem with the e-commerce users is they can not be interviewed just like the traditional IS development.
• **The back office systems:** Fast working of the e-commerce systems should be matched with the requirements for this it is necessary to integrate the front end of the IS systems.

• Each transaction stage of the life cycle should be properly evaluated to ensure that all the requirements should be included.

2) Business implementation

For business implementation it is required to create an e-shop and for this the organization needs to –

• To set up new business infrastructure for supporting the new e-commerce technology.

• This new technology should be provided to the intended users.

1.16 E-commerce evaluation:

Care should be taken to evaluate the systems for the users which are outside the company.

Proper evaluation of all the systems should be done for the users which are outside the company including the internal stakeholders. A system should be capable of knowing customer reaction. In this case those customers who give a system before completing the transaction are inaccessible. Evaluation process has three levels -

**Improve it:** No proper method exists for this only testing of the system can decide if any changes are required in the system and whether the site can be improved.

**Revise it:** The planning can be modified. The planning and implementation can be done on the basis of results of previous use of e-commerce.

**Update it:** Changes in the company policy, competitive position or evolving of new technologies of e-commerce can update the planning.

1.17 Security of E-Commerce

1.17.1 PCI Data Security Standard

E-commerce business is conducted over internet; because of this the business suffers from the virus attacks. Hackers may change or steal the files while the important files are passed over the internet. E-commerce websites should be protected according to the PCI Data Security Standard (PCI DSS) and best
methods for information security. Visa reports that statistical document is divided into physical and web stores in 2007.

Visa has given some indications of the security violation.

- Unexpected or unknown transaction on the network from the card holder
- Unexpected IP addresses on the wireless network
- Unexpected or unknown transactions between store and headquarter location.
- Presence of unexpected services and applications configured to launch automatically on system boot
- Anti virus program is disabled or is not running properly without any reason. Failed login attempts in system authentication and event logs
- Card holder suffers from unknown third party connections without prior intimation.
- In web server event logs, SQL injection attempts are seen
- Unexpected event logs are detected
- Presence of .zip, .rar, .tar files type of compressed files containing card holder data.

A compromise may be detected by the merchant, a service provider or Visa common point of purchase fraud investigations. The card organizations (Visa®, MasterCard®, etc.) expect merchants to follow PCI DSS standard. The merchants not following the standard are charged fines, loss of tiered interchange data, legal liability and also the problem of reputation and business loss. If PSI DSS standards are not followed they are charged fines up to $500,000 by Visa, in addition will have to pay for fraud losses from compromised card account details. Recovery charges may exceed PCI non-compliance fines.

**To overcome these problems there are certain Do’s and Don’ts which need to be followed for payment card security.**

DO’s and Don’ts for the payment card security are given below -

1. Follow the PCI Data Security Standard (DSS).
2. Protection of the card data should be done in storage and transmission. Card numbers should not be disclosed to others (DSS requirement 3.4). For security of storage methods like strong encryption, truncation, and hashing should be used.
During public network transmission strong encryption should be used to safeguard card data (requirement 4.1). Card data should be regularly encrypted while transmission across internal networks between web application and database servers. Merchants having limited security resources and expertise should do outsourcing of processing, transmission, and storage of cardholder data from PCI compliant service provider which will reduce the security risk for the data. But this will not reduce the need of being alert regarding card holder data security.

3. Do not store the data which is banned. For further transactions E-commerce merchants allow customers to store their card numbers. PCI standard, does not allow to store CVV2 data (the three digit number on the back of a card). Hackers may use CVV2 data along with the card numbers to carry out fraud transactions. CVV2 is used initially for authorization request Per Visa, to set-up a recurring transaction for an Internet or telephone order. However, for the further transactions CVV2 is not required.

4. A check should be made on the data flow for the appropriate controls whether they are placed and where they are placed whenever card data is stored, processed and transmitted. This is a critical DSS standard for keeping the data secure.

5. Network security should be of world class. Routers and firewall configurations are used for demilitarized zone networks. World class network security should be applied. DSS uses firewall and router configurations for network security in demilitarized zone networks, databases on an internal network, etc. To isolate card data always network segmentation should be used.

6. Network systems should be strong enough to withstand the attacks. Operating system and commercial applications should be configured to meet industry standard of security. Antivirus and malware should be used with appropriate options to protect the data.

7. Software development should be done according to the industry standard. Security awareness program should be arranged for the developers. Developers who can do secured coding are only appointed. Include security tools while developing software.
8. Web applications are utilized. DSS requirement 6.6 has two options 1) use of application firewalls 2) conduction of code reviews.

- Manual review of application source code
- Accurate use of scanning tools for automatic source code analyzer tools.
- Weaknesses of the manual web application security.
- Proper use of automated web application security weaknesses scanning tools
- The list can be adjusted according to the requirement of the security above and beyond minimum DSS requirements. E.g. conduction of code reviews and use of an application weakness scanning tool

9. Execution of penetration testing.

10. Carrying out network scans

11. Utilize secure payment applications

12. Analyze the list of non-compliant payment applications.

13. Detective control should be carried out. For detecting attacks there should be a layered monitoring program and to provide forensic information for incident response. The program should be able to detect the incident in earlier stages to stop further data compromise. The damage will be high if the incident is not detected for years. Detective controls are - centralized audit logs, log monitoring, file integrity monitoring and intrusion detection software.

14. New threats and weaknesses should be monitored. New weaknesses are detected daily.

15. Care should be taken while finding service providers. Liable merchants are only considered when card data is shared with the service provider. Therefore it is necessary to find the security control based on the service provided. If the organization name is not listed on Visa’s List of Compliant Service Providers, then ask to review a PCI Report on Compliance. If PCI report is not available then provider should be chosen depending on the PCI requirements and security controls and the one which is associated with their custody of card data.

16. Evaluate custom application functionality by considering the evaluation of card applications. Care should be taken to access authorized data depending on the business needs.
17. Fraud detection methods should be implemented. Access should be denied for the card with fraud. Normal business activities create a pattern with its behavior. Normal business activities have an expected pattern of behavior. Alert message should be given whenever fraud is detected. For example, if authorized user accesses twice the normal amount of data then alert message is flashed.

18. Incident response program should be utilized.

19. Find the threats and weaknesses and identify emerging threats and weaknesses to reduce the risk as appropriate.

E-commerce security needs technology and variety of disciplines. If the organization is lacking specific skill set then qualified persons should be hired or choose a service provider with the required qualities. Payment cards are attacked by organized crime. Hence do not disclose card data to increase the risk.

1.17.2 **Network Security with the use of Firewall**

Firewall is a device used for security of the organization’s data on the network from unauthorized external access. It links intranet with internet and filters the traffic and provides security by not allowing the harmful programs to enter the internet. Packet filtering Firewalls are the simple firewalls which are used in some networks they filter the data according to the specified criteria such as –

- Type of access such as email, ftp, telnet as determined by TCP port number
- Traffic path
- IP address of source or destination
- Time of day

1.17.3 **Data Encryption with Secret Keys**

Data which is passed from the public network may be accessed by unauthorized person. In encryption process the data is modified in a specific format so that it is not accessed and read by unauthorized person. Similarly data stored in databases should be mixed up. Method of changing data from readable (intelligible) to unreadable (unintelligible) format is known as encryption. Method of converting the data from unreadable format to readable format is known as decryption. The data in the readable format is called as plain text and the data in the unreadable format is called cipher text.
1.17.4 Digital Signature

1. It is used to ensure that message received from sender is not changed it is the original message sent by the sender only.

2. Digital Signature should be attached to the message sent by sender using private key.

3. The hashed message in Digital Signature system is decrypted using sender’s public key.

Certificate Authority for Digital Signature

• As the sender’s public key decrypts the hashed message, it should be certified as belonging to the sender by some independent authority.

• Public keys need certificate of authenticity, as they are used to verify the digital signature.

• Database of public keys of the organizations are used in e-commerce transactions to verify the digital signature.

• Business partners can send request to certifying authority for the authentication of public keys. Certifying Authority grants request and charges a fee for his services.

1.18 Payment in E-Commerce

1.18.1 Types of payment in e-commerce

Payment is a main part of commercial transaction against the goods supplied. In E-commerce four types of payment are made. They are as under -

1) Credit card payments
2) Electronic cheque payments
3) Payment for services such as internet, these payments is micro or small payment.
4) Electronic-cash payments
5) Digital cash (e-cash)
6) Online stored value system
7) Smart Cards
8) B2B payment system
1.18.2 Credit card payment\textsuperscript{[20][21]} - Online credit card is much similar to actual card being used no card impression is taken and no signature is available. For credit card payment there is a participation of four members. They are as follows:

- Customer and credit card of him
- Merchant who accept the credit card (such as VISA, MASTER CARD etc)
- issuing Bank of the credit card which collects payment from customers.

In this process the bank or the financial institution sets up an account with a merchant and authenticates the card information which is send electronically by merchant and sanctions sales depending on the credit card status of the customer. Bank then accepts the credit cards. Credit cards may be of different credit card companies. Merchant gets the payment from the bank with guarantee. Bank issuing credit card returns financial information.

When customer wants to purchase he or she adds the item to the merchant’s shopping cart When the customer wants for the payment a secure tunnel through the internet is created using SSL (Secure Socket Layer). Using encryption SSL secures the session during which the credit card information will be sent to the merchant and protects the information. Once the consumer credit card information is received the merchant software contacts a clearing house which authenticates credit card and verifies account balances. Clearing house contacts the issuing bank to verify the account information. Once verified the issuing bank credits the account of the merchant’s bank. The debit to the consumer account is transmitted to the consumer\textsuperscript{[21]}.

1.18.3 Electronic Cheque Payment

A special hardware is required in order to sign the cheques which are used to do transactions which are attached to PC. A special hardware is used to do encryption of the signature. Public keys of the business partners are authenticated by certifying agencies.

Steps in transaction

1. Purchaser sends Purchase order and payment advice with his private key. He encrypts his Public key certificate using vendor’s public key and sends it to vendor.
2. Vendor converts the message in the readable format using his private key checks certificate and cheque and then attaches deposit slip encrypts with bank’s public key and sends it to bank. Then he also sends public key certificate after encryption

3. After checking the signatures and credits, bank clears cheque. Credit advice is given to vendor and combined debit advice is sent to purchaser from time to time. Payment for services such as internet, these payments is micro or small payment.

**Figure 1.8: Electronic Cheque Payment**

![Diagram of Electronic Cheque Payment](image)

**Payments of Small Amounts on Internet**

**NETBILL’S PROPRIETARY SYSTEM**

- Only after customer is charge, information delivered
- After information is delivered, vendor guaranteed payment
- Net bill is the intermediary

**MAJOR STEPS**

- When customer asks for information, vendor sends encrypted information to the customer but without encryption to customer.
- Along with the information obtained, Payment order is sent to vendor
- Copy of purchase order and key for decryption is sent by Vendor to NET BILL.
• Credit of the customer is checked by NET BILL. If it is ok it sends key to customer.
• Vendor account is credited and customer account is debited and a key is send to the customer to debit customer account.
• Customer decrypts information

Figure 1.9: Paying for Small Internet Transactions

1.18.4 Electronic Cash (Digital Cash)
• For small payment Cash payment is done
• Cash preserves secrecy
• Cash should not be traceable
• It is cheaper than credit card transaction
• DES is normally used for these transactions as it is cheap and amount involved is small

Traceable cash payments

STEPS
1. Customer withdraws coins in various denominations signed by bank
   Structure of the file is as follows- serial no, denomination, signature of bank
   A copy of issued coins is stored by bank.
2. Using signed coins customer pays to vendor.
3. Bank checks for whether it is current or spent
4. If it is current, it authorizes dispatch of goods and credits vendor account with electronic coins
Digital cash was one of the first forms of alternative payment systems developed for e-commerce. The early generations of digital cash were quite complex and required the generation of entire new payment industry standards & practices. First generation digital cash worked as follows - To use e-cash customer had to first establish an account at bank that was using e-cash system. Once the account was established the customer then downloads digital wallet software on his computer. Then the customer could request a transfer of digital cash. Once the digital wallet had cash the consumer could spend that cash at merchants who were willing to accept it. The software would deduct the cash from the digital wallet and transfer to the merchants. The merchant could then transfer the cash back to the bank to confirm that it has not been double spent. The bank would then cancel the e-coins and credit the merchant’s account at the bank. These early concepts were not market successes proving too complicated for both consumers and merchant. One variation on the digital cash concept is gifi cash which is a form of e-cash that is earned as a “points”. Two of the best providers of gifi cash are Beenz.com (which issued points as a reward for purchase) and Flooz.com (which could be purchased as a form of gift certificate) both ceased operations in August 2001. Mypoints.com which issues points that can be redeemed for merchandise or gift certificates (but not cash) at partners sites in exchange for viewing ads or
trying special offers is still in business as of August 2001. However mypoints.com can be considered a gift cash provider although the primary focus of its efforts is developing loyalty programs for clients rather than providing an online currency \[^{21}\]. The way of handling digital cash and its details are given in table no. 1.8\[^{20}\]

**Table No. 1.6 Types of Digital Cash and their Year Founded /description**

<table>
<thead>
<tr>
<th>System</th>
<th>Year Founded /description</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Virtual</td>
<td>1994 – 1st secured stored value system based on credit card pre use deposits and pin numbers. Ceased operations in 1998.</td>
</tr>
<tr>
<td>Digital Cash (e–cash)</td>
<td>1996 Encryption based stored value system requiring digital wallet on hard drive to store e-coins. Ceased operations in 1998 returned as e-cash</td>
</tr>
<tr>
<td>Millicent</td>
<td>1996 Digital equipment Corporation’s entry into micro payment e-cash. Now a Compaq platform product with multiple options.</td>
</tr>
</tbody>
</table>

**Peer to peer payment Systems**

<table>
<thead>
<tr>
<th>System</th>
<th>Year Founded /description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paypal</td>
<td>1999 free P2P micropayment system</td>
</tr>
<tr>
<td>Yahoo Paydirect</td>
<td>1999. Free Yahoo P2P payment service</td>
</tr>
<tr>
<td>Money Zap</td>
<td>1999 Western Union fee-based money transfer system</td>
</tr>
</tbody>
</table>

1.18.5 **Online Stored value system:** Makes customer pay instantly to merchants and other individuals based on value stored in an online account. Some stored value systems require the user to download a digital wallet (for example Monetta’s debit service and eCharge’s prepaid service) where as others require to simply sign up and transfer money from their existing credit card accounts into an online stored value account. Online stored value systems rely on the value stored in a consumer’s bank checking or credit card account. For example Ecoun offers a prepaid debit account. To use Ecoun a consumer first establishes an account with Ecoun funded by a credit or debit card. Account information is transferred via the web using SSL. Once Ecoun has verified the account and its balance with the consumer’s card issuing bank. Consumers can shop on the web where Mastercard is accepted and email payments to individuals. Ecoun debits the consumers account and transfers the funds to the merchant or individuals. At the end of the
month the consumer’s card issuing bank sends a statement showing the debit to Ecount. Rocketcash is another company that offers online stored value system in this case aimed at teenagers [20]. Table no. 5 gives detail online stored value system and use of cards.

Table 1.7: Online Stored Value System

<table>
<thead>
<tr>
<th>System</th>
<th>Year Founded /Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecount</td>
<td>1998 Prepaid debit account</td>
</tr>
<tr>
<td>Monetta Prepaid</td>
<td>2000 Prepaid virtual card that allows consumers to make online payments without using a credit card or bank account digital wallet.</td>
</tr>
<tr>
<td>Monetta Debit</td>
<td>2000 Account that allows users to pay from existing checking savings of credit accounts Digital Wallet</td>
</tr>
<tr>
<td>eCharge</td>
<td>1997 Prepaid account with digital wallet.</td>
</tr>
<tr>
<td>Millicent</td>
<td>1998 Prepaid cards purchased at convenience stores (Japan only)</td>
</tr>
</tbody>
</table>

Smart Cards

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mondex</td>
<td>1994 smart card stored value system in which value is stored on a chip.</td>
</tr>
<tr>
<td>American Express Blue</td>
<td>1999 combined credit and smart card</td>
</tr>
</tbody>
</table>

1.18.6 Smart Cards as Stored Value System - are another kind of stored value system based on credit cards that have embedded chips that store personal information. Where as credit cards store a single charge account number in the magnetic strip on the back smart cards can hold 100 times more data including multiple credit card numbers and information regarding health insurance transportation personal identification bank accounts and loyalty programs such as frequent flyer accounts. This capacity makes them an attractive alternative to carrying dozen or so credit and ID card in a physical wallet. Smart cards can also require a password unlike credit cards adding another layer of security. There are two types of smart cards – contact & contactless depending on the technology embedded. In order for contact cards to be read they must be physically placed into a card reader while contact less cards have an antenna built in that enables transmission of data without direct contact. A stored value smart card such as retail gift card purchased in a certain dollar value is an example of contact card because it must be swiped through a
smart card reader in order for payment to be processed. A highway toll payment system such as EZPass is an example of a contactless smart card because the EZPass device in the card is read by a remote sensor with the appropriate toll automatically deduced from the card at the end of the trip. The Mondex card is one of the original smart cards invented in 1990 by Natwest bank in England [21].

**B2B Payment Systems** - Most of the payment are done physically by checks because of the complexity of the B2B business. There are two main types of B2B payment systems that have risen to the challenge. They are – 1) Systems that replace traditional banks 2) existing banking systems extending to the B2B marketplace. No system on the market today yet provides all of the features listed. Actrade is an example of an online B2B payment system that replaces the functionality provided traditionally by banks. Actrade serves as an international marketplace intermediary in the payment process by paying foreign sellers immediately and allowing domestic buyers a variable time a variable time period for repayment [21].

1.19 **Recommender systems in e-commerce** [11]

**Recommender systems** are the systems in e-commerce which help in information processing and allow the customer to choose the product according to their needs. For the real world this is impossible for the physical market but in e-commerce it is possible. This systems help in suggesting the products to their customers before purchasing the product. The product is suggested depending upon the top sellers on the site and the demographics or the previous buying behavior of the customer upon which it will decide the future behavior. Recommendations of forms include product suggestions for the customer, product information of the required product, summarizing community opinion and then providing community critiques. This systems help to analyze the recommender systems at six market leading sites. Recommender systems are the systems which help in customizing the products according to the product needs of the customers to sale them on the website. Recommender systems are similar in some respect and are different than marketing systems and supply-chain decision-support systems. Recommender systems which make use of computer are called as **automatic recommender**.
systems. The examples of the recommender systems are Amazon.com, Drugstore.com, and MovieFinder.com. E-commerce sales is increased using recommender systems in three ways –

1) **Making website useful for sales**: Visitors only look over the site to see the product information and do not purchase anything. Recommender systems find the product of the choice of the customer.

2) **Increasing cross sell**: Recommender systems increase sales by suggesting additional products to the customers.

3) **Building faith**: Trust is an important factor for the online business. Recommender systems build trust by creating a value added relationship between the site and the customer.

1.20 Intelligent Techniques for E-Commerce [12]

1.20.1 AI systems

*AI is the discipline that aims to understand the nature of human intelligence through the construction of computer programs that imitate intelligent behavior.*

AI techniques are successfully developed and used in most of the areas of science, engineering, education, business, etc. AI techniques are extensively used in the development of e-commerce systems. The field of e-commerce can be classified as B2C e-commerce and B2B e-commerce, in terms of AI techniques involved in this field.

1.20.2 Intelligent Agents in Ecommerce [13]

Artificial intelligence (AI) is used in many information systems and they cover a important task of the system. Its use was limited in the past due to its complexity and huge designs. Also there was a lack of expert system developers of these systems. AI systems are necessary in the tasks such as -1) workflow 2) data mining 3) production arrangements 4) supply chain logistics 5) e-commerce. New AI systems have been developed which are small in size. Some of the limitations of e-commerce can be overcome using intelligent agent technology. Basic e-commerce systems need experts to judge buyers, contract negotiators and marketing specialists.
This model finds the buying behavior of customers and to decide actions and decisions which are involved while buying goods and services. This model is used generally for retail markets but it covers many areas such as business to business and business to consumer as well. Electronic commerce covers many problems which are not related to buying behavior model. Buying behavior of the customer is explained by many models which are - 1) Nicosia model 2) Howard- Sheth model 3) Engel-Blackwell model 4) Bettman information-processing model, 5) the Andreasen model. These models are having a list of six basic stages of buying process. These models also explain whether agent technology can be used for the shopping. Six fundamental stages of buying process are-

- **Identification:** This stage finds out the need of the buyer which is not fulfilled yet. This need arises due to product information. During purchasing, agents can help the customers in purchasing depending on the similar suppliers or habits of customers. The oldest example of this is software agents named monitors which are having a set of sensors or data streams. These sensors start operating when any pre specified condition is found. In general use there are plenty of examples. One of this is notification agent called Eyes of the website Amazon.com which notifies the customer about the availability of a book required by the customer.

- **Brokering:**
  
  a) **Product Brokering:** Once buyer decides to buy, he has to decide what to buy using the product information. Customers need is decided by several agent systems like PersonaLogic, Firefly, and Tete-a-Tete which lower the system cost. This stage gives us the set of goods.
  
  b) **Merchant Brokering:** This stage combines the above stage of which product to buy and helps to determine from whom to buy. Many customers are not concerned with only the price but also want to consider the value added services like warranty, availability, delivery time and reputation.

- **Negotiation:** Price and other terms of transaction are finalized in this stage. Transaction cost increases due to real world negotiation this cost can be high for consumers and merchants. In the real world there are many hurdles for
negotiating such as time required, irritations, searching locations of all the parties etc. which do not arise in digital world. Most of the business to business transactions need negotiations. In Retail sector we are well known with fixed product prices. Hence the merchant does not need to fix the price. So the burden of price fixing is pushed to the market place.

- **Payment and Delivery:** This stage comes after the termination of the negotiation phase or negotiation can come after this stage. Sometimes product and merchant brokering can be affected by the payment or delivery options.

- **Product Service and Evaluation:** In this stage product and customer service is given. It also determines overall buying experience and decision.

On the basis of above stages we can find out the roles of agents as mediators in e-commerce. The nature of agents decides whether they can be the mediator for the consumer behaviors which includes information filtering and retrieval, complex coordination, personalized evaluations and the interaction based on the time. These roles are related to the identification need, brokering of product and merchant, stages of negotiation of the buying behavior model. The following table gives stages of buying behavior and their several representative agent systems.

### Table 1.8: Stages of Buying Behavior and their Several Representatives

<table>
<thead>
<tr>
<th>Stages</th>
<th>Personal Logic</th>
<th>Firefly Bargain Finder</th>
<th>Excite's Jango</th>
<th>Kasbah Auction Bot</th>
<th>Auction web</th>
<th>T@T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.need Identification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.Product brokering</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.Merchant brokering</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>4.negotiation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>5.Payment and delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.service and evaluation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 1.20.3 Examples of intelligent systems

**PersonaLogic (http://www.personalogic.com)**

This tool finds out the products which meet the needs of the consumers using different features.
**Firefly** (http://www.firefly.com)

After comparing the consumer’s product ratings with other consumers, recommendation mechanism known as the “collaborative filtering” is used to find the products needed. This system uses like minded peoples recommendations which may include products like books, music also the products which cannot be characterized easily like restaurants and web pages.

**BargainFinder** (http://bf.cstar.ac.com/bf)

This tool is used to find the prices and availability of music CDs required by the user. To find this required product it uses meta crawler, a meta search engine which uses the parallel search architecture.

**AuctionWeb** (http://www.ebay.com/aw) and **OnSale** (http://www.onsale.com)

These are two popular web sites that sell renewed and second-hand products with the use of auction protocols. Their popularity is due the novelty and entertainment value, negotiation done on the prices of goods, getting the wanted product in least price.

### 1.21 Factors Affecting the Growth of Electronic Commerce

Growth rate of e-commerce is affected by many factors in different parts of the world. They are as follows -

**Trust:** The major factor which should be taken care of is the trust and familiarity of the medium by the suppliers and customers.

**Understanding:** Even if people are aware of internet many people are not having clear understanding of electronic commerce. People should be made aware of the misunderstanding, risks and benefits of e-commerce with the use of awareness program.

**Skills:** Skills of the workers is an important factor for the growth of e-commerce which should be taken care of. Recently USA, Germany and the UK allowed internet workers to move to their countries by relaxing visa controls. This shows that there is a tough competition and now for the internet expertise.

**Existing business processes:** As many business enterprises are taken over by new dot com companies they have a fear to loose existing market and hence they are making more and more investment.

**Public Policy:** Electronic commerce has many problems associated with the terms of taxation, regulation, security and privacy. The electronic commerce
model has been developed in United States is not fit for all the countries and hence there are still important problems which are to be solved in this area.

**Costs:** E-commerce is a low cost alternative in many countries making the information available in least price compared to with conventional business transactions, making business information available at a much lower price than with usual, client-server computing. But e-commerce needs additional cost to operate and is an important factor for increase in the cost.

### 1.2 Significant barriers faced by e-commerce industry

![Pie chart showing significant barriers](chart.png)

- **(7%)** Insufficient corporate budget
- **(6%)** Other
- **(26%)** Lack of trust or familiarity
- **(8%)** Emerging regulations in such areas as tax and privacy
- **10%** Cost of implementation
- **(10%)** External business processes
- **(11%)** Unavailability of skilled workers
- **21%** Lack of understanding

**Insufficient Corporate Budget:** It is seen that those who want to increase use of e-commerce in their organizations has to tackle the problems such as expenditure for the particular year and the existing IT budgets.

**Technology Limitations:** The major opposition to the electronic commerce systems comes due to Speed, the reliability and the usability of it. But the survey
shows that technological problems are not as important as compared to human issues such as trust, familiarity and understanding.

**Graph 1.3: How strongly the trust will effect the growth of e-commerce**
1.4 Trust related issues for corporate acceptance of E-commerce

Trust Related issues for corporate acceptance of e-commerce

- (15%) Uncertain about how well info privacy and data integrity is protected
- (17%) Fear that technology infrastructure is not enough to prevent attacks
- (25%) Payment security affected by new technologies and differences between economies
- (8%) Companies uncertain of business risks of deploying e-commerce
- (8%) Lack of universally accepted standards
- (4%) Fear that technology infrastructure is not enough to prevent attacks
- (4%) Lack of established methods of resource
- (4%) Other
- (14%) Uncertain about the identity of communicating parties
- (8%) Compliance for established regulations governing commercial behavior
- (1%) Don't know
1.22 Limitations of e-commerce:

1.22.1 The problem faced by senior citizens [15]

Carrying out business transactions using web is the key of the business. As announced by the U.S. Department of Commerce (2004, 2006a, 2006b, 2007) total retail e-commerce sales in 2007 were $136 billion. An increase of 25.6% from the previous year and 20.7% increase was observed compared to the year 2002. There is an increase in total e-commerce retail sales For the year 2007 it were at 3.3% of total retail sales. Even if there is growth of e-commerce and in future also the growth will continue, still companies have reported problems in obtaining new customers and retaining existing ones. Also there are problems making visitors actual purchaser of the website. All this can be explained using Technology Acceptance Model (TAM). It states that the success of the system depends upon the acceptance of the system by the user. Acceptance of the system depends upon two variables -1) apparent usefulness of the system 2) apparent simplified use of system. According to the model if both this is points are fulfilled the user has an intention of using system.

Figure 1.11: Technology acceptance Model (TAM)

Seniors face problems of using computers and navigating websites due to age, their sight their cognitive functions and their motor skills change or function slowly. Due to this seniors cannot use the website effectively and easily and they can not conduct the transactions easily. Senior’s are having eye diseases. Eye disease can result in vision problems and may cause complete blindness. Senior people can have three major eye problems - 1) age-related macular degeneration 2) cataracts 3) glaucoma. All these eye problems will create problems in the use of a website by a senior citizen. They may have problems like -1) moving a mouse 2) positioning a cursor. Also they may have problems of hands and fingers
resulting in impaired control of the usual input devices for computers like mouse and keyboard. Also they may have memory problems such as - 1) a decrease in working-memory capacity, often seen as short-term memory loss; 2) a decline in the rate at which information can be processed and understood; and 3) a decline in the ability to ignore irrelevant information. Because of these medical problems seniors are unable to operate the website and carry out electronic transactions. Also there is an increase in senior population very year and increased use of computers by them at the same time their limitations due to age to handle computers. To overcome this e-commerce companies are finding new ways to overcome these problems in B2C e-commerce. A senior’s behavioral intention to use an e-commerce Web site had a positive but not significant effect on a senior’s decision to actually use and purchase from the Web site. Ease of use of the Web site, the constructs Web Site Usability and Internet Usability. The path coefficients indicate that between the two independent constructs, Web Site Usability exerts a greater influence than does Internet Usability. Once a senior is confident he/she can use the Internet, it then becomes the usability of the Web site that exerts the most influence.

The test of the robustness of the Technology Acceptance Model (TAM) is significant when applied to e-commerce adoption by seniors. With the exception of the very weak relationship between the behavioral intention to use an e-commerce Web site and the actual use of a Web site, the model’s predictive and explanatory capabilities still hold true. Useful Web sites have products or services that consumers need or want.

If seniors can overcome computer and Internet usability barriers, they could become eager and willing adopters of these technologies. Web designers should understand that Web sites must be both useful and easy to use and that the aging process can directly influence how easy a Web site will be to use.

1.22.2 Familiarity and trust in e-commerce [16]

According to the Federal Administration and the Better Business Bureau, increase of e-commerce is possible if people start trusting internet vendors. There is a need to increase peoples trust and confidence. People do not buy online due to the
problems such as security of payments, reliability of companies and lack of privacy policy. Trust is an important factor in many social and economic interactions where new technology and important decisions. Trust is also necessary while downloading any important software from net. For e.g. on Amazon.com website people has to deal with complex operations. This complexity is reduced by the application of trust. This is due to the fact that trust removes unwanted and bad future actions of other future or organizations. In case of Amazon.com it would reduce the unwanted behavior such providing misleading information to the customers by the website or misusing credit card information. Trust is an important factor for customers as well as the vendors. Trust would be necessary in both the cases due to guaranty the customers need in the book purchase. If trust is not there it creates complexity of operations. This theory is supported by the Better Business Bureau's findings and industry reports. This proves that, increased degrees of trust in an e-commerce vendor will increase the trust and will make people to inquire and purchase about the products on the website. Also people find it difficult to find the required information. If people are familiar and have the knowledge and understanding of relevant procedures and technology of the vendor then this would result in increased use of the website by the vendor. This also proves that “Increased degrees of familiarity with an e-commerce vendor and its procedures will increase people's willingness to inquire about products and to purchase products on that vendor's website”.

Also familiarity also increases trust due to the fact that familiarity can build trust when the vendor shows trustworthy behavior and ruins trust if the vendor does not show trustworthy behavior. E.g. if people are familiar with Amazon.com website their trust increases. This shows that increased degrees of familiarity with an e-commerce vendor and its procedures will increased trust in vendor. Also the trust can be influenced by the nature of customer. If he is trustworthy in nature he will trust the e-commerce vendor. This shows that “The stronger people's nature to trust is the more they will rust e-commerce vendor”.
### 1.22.3 Tax issues due to use of internet for the business

<table>
<thead>
<tr>
<th>Tax System Feature</th>
<th>Conflicting Internet Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A type of tax designed to elaborate a state revenue source which is for the industries and dependant on physical items within the state borders.</td>
<td>In the information technology or the internet age borders doesn’t matter services and We are now in the information-age where borders are not very important, and intangibles and services are a bigger part of GDP Under the e-commerce model taxes are dependant on the location than they were years ago. A company can achieve large customers with only few locations.</td>
</tr>
<tr>
<td>In taxing jurisdiction Collection of the tax is done if there is physical connection with the buyer. States can collect use tax from the residents but such collection is difficult.</td>
<td>Internet-based businesses may just need one physical location, yet sellers can deal with buyers throughout the world (from the single physical location). Thus, the quantity of remote sales (where nonpresent vendors are not required to collect use tax from customers) will increase and tax collections will decrease.</td>
</tr>
<tr>
<td>In this type it is necessary to know whether the transferred item is tangible or intangible.</td>
<td>It is not easy in today’s transactions to find whether the item is tangible or not. In addition some tangible items can be converted to intangible items for e.g. digitized music transferred via a modem. It is not known whether the item should be taxed according to the principle of neutrality. Or if a particular item is intangible makes it non taxable.</td>
</tr>
<tr>
<td>It is necessary to know the type of seller whether he is a irregular seller and also need to know buyer as he may be irregular buyer.</td>
<td>With some types of e-commerce transactions, it might not be easy to determine the type of buyer or seller. For example, some sellers at auction sites are businesses and others are individuals making an occasional sale. Also, exchange sites may have customers buying both for self-use and for resale and it may not be easy to track different types of purchases</td>
</tr>
<tr>
<td>As the tax depends upon the location the tax is destination based tax.</td>
<td>This type of tax is not dependant on the location.</td>
</tr>
<tr>
<td>Also this type of tax charged differently in each jurisdiction and this depends upon rate terms, due dates, forms, definitions etc. It is jurisdiction dependent. There are total 6,000+ jurisdictions in the U.S.</td>
<td>It is not jurisdiction dependent. Internet can be operated from any part of the world using any portable location. Of physical location are not necessary. Internet addresses are geographically indifferent. These addresses are not dependant on geographical locations.</td>
</tr>
</tbody>
</table>
Various tax issues exist due to the introduction of internet. This tax issues exist because numerous tax issues already existed and therefore had a lot of uncertainty.

Various previous rules do not fit well within the rules and theories underlying current tax rules that were created in a world involving tangible property and the ability to physically observe transactions. The following overview of sales and use tax will show the problems of applying sales tax and use tax to the internet.

1.23 Myths of E-commerce

E-commerce is having a lot of myths associated with it. They should be understood in order to use e-commerce in future. Which are listed below –

1) Myth 1: E-commerce is primarily about technology. (E-commerce is 5% technology and 95% business.

Only 5% of E-commerce is technology and 95% it is a business. The use of Uniform Interactive Communication code is not the same used by all the electronic industry participants which are used for transferring the business in e-commerce. Unique rules and standard should be maintained to overcome the large business issues which must be sorted out first before using e-commerce for the business. Electronic industry has IPC which would set the standards for the use of e-commerce. E-commerce is not just a technology but an agreement on the set of rules.
2) **E-commerce will replace purchasing**

Many evolutionary changes are observed in purchasing. Twenty or thirty years ago, it was seen that, cost of materials or equipment and period was dependant on the purchasing function. Some benefits were provided by the selling process for the purchasing agent such as long luncheons, sports tickets, and vacations. The electronics industry and business started taking care of the technology and began to take care of the quality to survive in the race and to cope with the rapid changing technology. The purchasing agent and not the buyer turned his attention to the metrics such as quality, on-time delivery, and product innovation, probably best described as lowest total cost in use. Today there is a tremendous growth in outsourcing. The supply chain has obtained more significance; purchasing professionals are changing their role in to relationship managers. Industry suppliers and their performance may increase or reduce the customers. In addition, generational changes which are shaping the latest trends. The business practices has replaced three-martini dinner and a long night out with the supplier. The latest trend is getting the information 24/7 hours and giving time for personal things like family, extracurricular activities etc. When the company is not making use of e-commerce, this can be treated as a threat since it may affect the procurement process. In reality, buyer will likely take expanded role in the purchase order placement process. It is possible to have product knowledge and PO placement available 24 hours.

Wide ranging product databases can be seen online which allows the buyers to access data sheets, cross reference product, address upgrades, deal with obsolescence, and locate hard-to-find products at night. A knowledgeable materials management person will not be dependant on /product/quality engineering for the calculation of the bill of materials. A buyer now can access a large number of suppliers for the availability of the product, pricing, delivery and terms. Business partnerships can be formed where as offers can be effectively analyzed for the exchanged for the exchange of product and business data on a regular basis. Trust is developed and also performance is improved and hence phone calls, faxes, and visits are reduced. Lowest cost of ownership can be
obtained by using the product databases and by tracking the vendor performance via a large number of metrics. Because of the e-commerce model the buyers get the benefit of managing BOM in a reduced amount of time and their problems of inefficient shopping and ineffective communication between suppliers are reduced. This change creates a flexible, better informed individual gives essential component of the entire manufacturing process to the procurement department. It means that e-commerce is speeding up the process of purchasing. E-commerce will not replace purchasing.

3) E-commerce is a zero sum game

Use of e-commerce increases effectiveness and efficiency in the supply chain management. At the same time reduces transactions, inventory costs and reduces use of standardized parts. Savings are little, only one to two percent but they reduce the complicated processes of businesses with the use of auction sites. These auction sites reduce the prizes of products because of the competition but find new customers and offer economy. These sites also offer benefits such as supplier standards international currency exchange, transport charges, financing, credit, insurance, delivery times, and other related details of the supply chain. Besides trading these B2B market places include cataloging, collaborative supply chain planning, forecasting, engineering change management, and a lot which improves communication between buyer and seller. The prize can not be the only criteria for the customer. Modern selling organizations will adopt e-commerce and electronic marketplaces to lower their costs and strengthen customer relationships. You may face problems but still e-commerce will not be zero sum game for those making use of it.

4) E-Business Represents Interesting Opportunities, But For the Distant Future” (“E-Commerce will go away. It’s a passing fad.”)

A need of frictionless economy with considerably lowered costs of interaction and association are making the need of best specialization and network based value delivery. This trend is apparent in several industries like automotive manufacturing, electronics manufacturing, the computer software industry, etc. Many traditional barriers and best procedures are collapsing due to decreased cost
of information sharing and the ubiquity of the Internet. Companies are again focusing on central capability and outsource areas of their business which lack clear and uphold able competitive differentiation.

Information asymmetry supports competitive advantage and it is for the small period. Companies are getting higher returns due to high cost of searching for alternative suppliers, comparing pricing, effectively testing supplier capabilities, etc. But these things are changing rapidly. Customers do not require physical nearness for carrying out perform supplier screening or high-level carefulness. Easy to gather measures of business capability are obtained by factors such as material positions, price transparency, and performance. Customers need more information transparency and for this they choose global providers. Both customers and suppliers can obtain a lot of information for obtaining the features such as modernism, delivery capability, sound pricing and value-added services. Several factors suggest that e-business is working fine and is a reality today.

- United States is well versed with the infrastructure to conduct e-business and is in rapid

Several factors suggest that e-business is well underway and very much a reality today:

- Infrastructure to conduct e-business is largely in place within the United States and is in rapid usable mode globally. The internet is mass medium.
- Regulating force is necessary for most part.
- Business applications are being developed and used to help companies use e-business to obtain realizable benefits.
- Competition is growing with the e-business adaptation and is a key for competitive differentiation.
- Pioneers and pragmatists have understood that e-business and globalization are tightly combined and supporting in nature. Early adoption stage is over now. Barriers to e-business adoption are decreasing due to investment in the tools, technology and business infrastructure; at the same time the satisfaction due to competitive threats continue to rise. Changes in the technology bring intense
impact on businesses similar to the converging forces had during industrial economy. Combination of different technologies is having a deep impact on businesses just like other converging forces had in industrial economy. The need for e-business is fulfilled with the beginning of industrial economy and basic changes in economic assumptions. The bottom line impact has considerable potential and is understood by many companies today. We are following the e-business path which can be reversed. Companies are getting opportunity as well as threat with the use of e-commerce. Companies prefer e-business. Small amount of time is left for joining e-business.

5) **E-commerce is only about exchanges**

*E-commerce is about business processes as well. E-commerce is a win/win for all participants. It is about technology integration.*

With the use of internet buyers and sellers contact each other for exchanging goods and services. Resultant trading is made electronically and shipped traditionally. There are three main layers of e-commerce which show the power of internet. The exchange features are order matching, settlement and fulfillment. Net markets can be viewed as trading posts in which ownership of the products are changed. The B2B e-commerce undergoes several internal business processes to be presented in the trade. Internet has the power using which it can be extended globally with the use of B2B integration so that it can be viewed end to end in the whole commerce chain. A virtual super cooperation is built by the best companies with the integration of best suppliers, partners and customers. A significant and competitive environment is created for all the participants and it also creates barriers for the new comer’s entry.

After the purchasing decision is made execution of orders is done which is nothing but exchange but it does not mean that it is the sum total of e-commerce. B2B e-commerce consists of purchasing decisions and approval processes within the enterprise. Actual work of the extended enterprise is done to make any purchasing decision. For making best and favorable decisions the information regarding the conditions of inventory, work in progress, planning, and forecasting
is required. For the integration of the enterprises across certain markets in certain markets enterprise should collaborate and share the information which would give rise to B2B collaborative e-commerce.

The actual order exchange is the main visible function in B2B e-commerce. It comprises of execution of the order after the purchasing decision is made. The important features of an exchange are order matching, settlement, and fulfillment.

**Order Matching**
There are two major forms of order matching depending on the liquidity of the exchange – 1) static 2) dynamic pricing.

**Static Pricing**
Static pricing is also known as catalog ordering. Suppliers can prefix the prices or can negotiate prices between suppliers and buyers. Most of the purchasing in the printed circuit board industry is done with the help of static pricing.

**Dynamic pricing**
As orders can be matched instantly dynamic pricing is generally used for true commodity products. In dynamic pricing the exchange matches the order in real time as the goods are brought first in the market and prices are then adjusted automatically.

**Settlement**
Today, instant settlement is the accepted method for both the parties instead of third party exchanges like Purchasing-Cards, escrow payment through banks, and B2B payment networks because of the average order size which varies between $50,000 and $250,000 for most exchanges.

**Fulfillment**
Buyers and sellers are having fulfillment step which is complicated, costly but a saving step. Buyers may have orders to fulfill the needs of his customer. Shipping and delivery can be simple but these two processes may have many aspects of supply chain management.

In future there may be low cost services for order matching and settlement. The business will not remain simple exchange of orders. The myth “E-commerce is only about order exchange” describes current industry status rather than the nature
of e-commerce as it is emerging. Most businesses have studied e-commerce solutions and consider exchange the important process.

1.24. Challenges to the laws in cyberspace

In cyberspace age crimes are committed on the internet; the examples are fraud and child pornography. To locate these crimes there are various problems like judicial jurisdiction and e-commerce taxation. New crimes are committed using internet as an object along with the classical crimes such as spreading computer viruses etc. These new crimes are even more difficult to handle. To handle cyber crimes criminal law is being developed by courts and the government. Courts understand the current law and the government defines new laws and crimes when required. When the current law can not be applied to the crime new law is created.

1.24.1 Criminal law in the cyberspace

There are three main ways for defining the criminal laws in the country. They are - defining the judicial jurisdiction, defining the crime itself and defining the defenses to the crime. In the cyberspace crimes like fraud and child pornography are carried out on the internet. There are challenges of e-commerce taxation and judicial jurisdiction in applying crimes in a particular country. Along with the classical crimes, other types of crimes are committed where internet is the victim of crime in which computer virus are spread on the internet. These new crimes are also creating problems in the application of the criminal law. This approach has been supported positively and normatively by the scholars. The approach is to create new legislation to handle new internet and computer crimes.

Criminal law is used to handle these challenges. According to U.S. Department of justice for pre internet crimes committed on the internet, current criminal laws are applied along with the interpretation of court and legislature. The approach is to create new legislation to handle new internet and computer crimes. The Computer Fraud and Abuse Act (1986) is an example of such legislation. There is a growth of Criminal law which handles cyber crime. The methods of adjustments include court and legislatures. Court understands and adapts current law to cyber crimes where as whenever required legislature creates news laws and crimes. It is important how legislature handles difficult challenges and new crimes. When the
existing law cannot handle the circumstances, new law is created. While dealing with e-commerce taxation challenges we have to compare different challenges and should find their nature and difficulty. When the basic challenge is to be solved new legislation will handle it.

1.24.2 **Judicial Jurisdiction in Cyberspace**

Judicial jurisdiction among the countries is divided by international law in two leading principals - 1) the territorial principal – this gives judicial jurisdiction to the country when the matter has juridical connection 2) the personal principal - which has connection with the issues of the parties and which gives jurisdiction to the country. Apart from these two principals the effect theory is developed for controlling the persons which affect its territory or people.

In American law similar principals are applied for dividing the jurisdiction amongst different states of the country. A state is having authority on matter or the parties if it has minimum contacts. These principles when applied in the cyber space are having many difficulties as it is difficult to make the connection between cyberspace activity and any one jurisdiction. These challenges are similar to the international tax regime in taxing cross border e-commerce income.

The judgment about the every cyberspace case will be different in every court. Courts should maintain stable and common judgment for the cyberspace cases. It is observed that the courts are giving satisfying judgment about the cyberspace jurisdictional challenges which are common and stable for all the courts. Criminal law handles these challenges. For example, when the pre-internet crime is committed, according to the usual practice, current criminal laws are applied to these crimes and then the relevant changes are done to these laws if needed.

1.24.3 **Copyright Law in Cyberspace**

In digital age copyright law has a lot of difficulties. Information in the digital form is very cheap, easy virtual and global. This digitization of the information is increasing the difficulties in the cyber law. These difficulties are discussed in the past decade.

To handle the challenges in the cyber space, court is playing a major role in developing cyber law. The case law on copyright issues is very strong. For
example, in the mp3.com case the court ruled that mp3.com violated copyrights by copying records on its server and also replaying the records for its subscribers. The claim of fair use by mp3.com was rejected by the court. In the Napster case court claimed that Napster.com has violated the copyright law in its peer to peer activity. Also court rejected the claim of fair use by Napster.com. World Intellectual Property Organization (WIPO) introduced a general legal framework at the international level. Signatory countries developed these frameworks which passes new pieces of legislation according to the principals of the framework. This framework was used to handle the problems in the cyberspace. The Digital Millennium Copyright Act (1998) corresponds to American legislation. Europe implemented a special directive and other countries also introduced their own legislation following the WIPO framework. While addressing the challenges of international level in taxing e-commerce income, it is also necessary to study this mixed international and national tool to handle copyright law in cyberspace. While taxing e-commerce income we should consider national and international tools. International framework is necessary and must be designed for cross border e-commerce income. **Integrative Adaptation Model** can be used as a basis for taxing e-commerce at the international levels.

### 1.25 The Integrative Adaptation Model `[19]`

To address e-commerce taxation challenges the Integrative Adaption Model is used. This has four levels of adaptation in the present international tax management. According to the case law first step - is to develop income classification rules and residency rules.

Second step – New source rules should be developed based on the location of the parties in the while doing transactions.

Third step – Technology should be used to create tax laws.

Fourth step – Using international treaties, international consensus should be added. Use of International treaty which includes these different layers of the model is the first stage in the practical application of the model.

The **Integrative Adaptation Model** follows the basic approach of the positive laws of the cyberspace in different fields after applying the current law to the cyber
space. So at the beginning the present international tax regime is applied to the cross border e-commerce income. This application has many advantages – 1) International consensuses are maintained by the present international tax management 2) Instead of starting the international process from the beginning Integrative Adaptation Model makes use of this consensus and updates it. 3) It also takes care of the aspects of the management which are working properly for many years and which are quiet famous in the business and the legal communities.

Legal management is a construction which is newly growing since a long period. Integrative Adaptation Model helps in e-commerce taxation challenges and development knowledge by keeping it intact. Just like other fields of law the work will be done in tax field also. Integrative Adaptation Model's first feature is to find out what the tax field needs. Other fields of adaptations are compared and accordingly the tax field adaptations are done. This model is used to find out different challenges and the solutions for the tax find also the main hurdles in it. All the challenges of the tax field are having common features but they differ in nature and degree. Adaptations of such type change the current administration. Development of the case law is needed even if it is complete in it self in order to adopt it for new adaptations. It can be found out from the other fields that how much of e-commerce taxation is needed. Adaptations should be flexible enough so that they can be adopted in other fields also. Just like other fields adaptations of the international tax administration should be made.

1.26 Economics of E-commerce

Success of e-commerce activities can be evaluated and is called Value Inequality. Value Inequality means the resources consumed by the production, distribution and transaction processes which must be less than the value provided by the buyer. This will not work if the newness of the technology and business models does not stick to the economic fundamentals.

Electronic commerce strategy is to apply economic principles to the new technologies and business models. Because of reduction in the fiction of the physical world actual mechanical results resemble closer to the results predicted by simple physics. In
addition, reduction of fictions in the business world will make e-commerce similar to basic economic models.

Electronic commerce greatest value creation is possible with the following improvements –

- Reduction in the transaction costs
- Improvement in supply chain management
- Reduction of cost via global sourcing

Even if e-commerce growth is evident factors delaying implementation include –

- The necessity for businesses to upgrade their information technology systems
- Large honest costs and associated risks
- Security problems

Investment opportunities can be obtained through e-commerce and from the solution to the current limitations which include –

- Demands in e-commerce -1) Extranets 2) Enterprise Resource Planning and Customer Relationship Management systems 3) High security levels
- All these needs will be fulfilled by Application Service Providers

E-commerce is in the developing stage but is the most popular way for the business to develop its customer base and increase productivity. All the businesses use websites and online shopping has become popular in the recent years. It is possible to sell your products throughout the world with the use of web based store with an earth link total commerce package.

E-commerce applications are growing day by day. E-commerce use is also growing in various companies to speed the work and to bring perfection as well as to automate the work. The type of e-commerce which are more popular in the business world are – 1) B2B (e.g. commodity exchange) 2) B2C (e.g. Amazon.com) 3) online retailing using a website 4) online shopping

Various areas can be inspected for the problems of e-commerce faced by the businesses. E-commerce business can be useful as it can be used in the area like value improvement. -
Value Improvement: The main opportunities are of two types-1) the methods which help in reducing the prices of the goods purchased. 2) The methods that reduce the total cost of the material purchased. By the use of improved supply chain management, companies can reduce the cost. The buyers will have lower prices of the items purchased. Various opportunities for B to B and B to C business are as follows -

**Figure 1.13: Value Improvement Prism**

Table 1.10 lists the areas or factors for which e-commerce will be useful and also lists the improvements which should be made in the technology for the changes in the technology. New changes in the technology has made various changes in the working which should be accounted to improve the quality and speed as well as cost of manufacturing. Use of e-commerce lowers the costs through better supply chain management. This lowered cost is supplied to buyers in the form of low prices.

Buyers can have following problems – 1) upfront expenses 2) security 3) reliability / fulfillment risk 4) long relationship with vendors 5) Fear of higher prices 6) Commoditization: loss of specificity 7) Internal IT system not ready

Sellers can have following problems – 1) upfront expenses 2) security 3) Credit risk 4) Cannibalize existing relationships 5) Need to discount 6) Commoditization: loss of margins 7) Internal IT system not ready
Table 1.10: Potential value improvement

<table>
<thead>
<tr>
<th>Requirement for Lower pricing</th>
<th>B to C</th>
<th>B to B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of production costs or profit margin</td>
<td>Supply chain management should be improved</td>
<td>Global sourcing increases profit margin and reduction in prices temporarily which last for 3 to 5 years.</td>
</tr>
<tr>
<td>Reduce transport or inventory costs</td>
<td>Transport of rare items can be optimized by reducing inventory costs.</td>
<td></td>
</tr>
<tr>
<td>Decreasing sellers transaction costs</td>
<td>Very likely</td>
<td>Very likely in MRO</td>
</tr>
<tr>
<td>Eliminate inconsistencies of the prices (lower prices for some, raises for others)</td>
<td>Reduction of customer database which finds total cost of serving different customers and the benefits arising out of it who have been subsidized.</td>
<td></td>
</tr>
<tr>
<td>Lower pricing can be obtained by Lowering Total cost of materials acquisition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eliminate sales tax</td>
<td>Very likely</td>
<td>For small business requirements of use tax it is difficult.</td>
</tr>
<tr>
<td>Better Supply chain management by reducing unneeded materials, getting materials when needed or late deliveries rush orders.</td>
<td>Some possibilities (less spoilage fewer special trips to store), ability to generate value net of costs in home delivery depends on dense routes</td>
<td>Excellent opportunities especially given growing popularity of build to order customization. Fast new product development techniques</td>
</tr>
<tr>
<td>transaction cost buyers is reduced</td>
<td>Purchasing is done via broadband, doing research on consumption problem and also solving purchases contextual buying opportunities</td>
<td>Are possible specially in MRO some contextual opportunities are researched, problem of consumption is solved for them.</td>
</tr>
</tbody>
</table>
1.27 Factors affecting the growth and Needs of Electronic Commerce

1) **Supply chain coordination** – Due to supply chain coordination money can be saved by the availability of the material and for this companies should maintain proper internal IT systems to get the benefits of e-commerce.

2) **Global sourcing** – Global sourcing creates more capacity, which causes a temporary excess of lower prices and for this there is a need of finding global suppliers especially for custom fabricated products.

3) **MRO** – Online MRO purchasing reduces transaction costs. For this it is needed to utilize a software to connect corporate employees with vendor’s catalog.

4) **Price Monitoring** – Companies want close relationships with vendors, but at the same time want to monitor the prices. For this companies need service to provide pricing information for both catalog and custom fab parts.

5) **Security** – Security is needed for growing volume of transactions and rising price tags. But for this greater security is needed for orders, company information provided to vendors and payments.

6) **Minimizing Up front cost and Risk** – E-commerce needs substantial investment with substantial risks. It also needs cost and time for completion and functionality. For this company need to pay per transaction or per month with low up front expense and risk.

7) **Extranets** – It is the need of the companies to make production plans and capabilities accessible to vendors and buyers and not to competitors. Use of extranet can solve this problem.

8) **Pushing ecommerce to less sophisticated buyers** – Here technology resistant buyers will accept convenience while convienient technology will be used for less sophisticated buyers for e.g. kitchen counter scanners.

9) **Growing internet usage** – For this e-commerce will grow both in number of users and their intensity of use. For this it is needed to grow internet infrastructure which needs routers, bandwidth, computers and appliances etc.
1.28 Prospects of Electronic Commerce

- 148 million people are online and the figure would increase year by year.
- In 1999, 100 million shoppers are expected to spend US dollar 15 Million in the cyber market space.
- The areas which will be growing are financial services, entertainment, travel and groceries.
- Returns from e-commerce depend upon how the processes are being influenced by e-commerce.
- Potential of e-commerce would grow beyond imagination in few years.
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