“A Critical Study of E-Commerce in the Pharmaceutical Industry”

A Thesis Submitted to

To

TILAK MAHARASHTRA VIDYAPITH

For the Degree of Doctor of Philosophy

Under the Faculty of Management

By

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Under the Guidance Of

Dr. V. D. NANDVADEKAR

June 2014

CERTIFICATE OF THE GUIDE

CERTIFIED that the work incorporated in the THESIS “A CRITICAL STUDY OF E-COMMERCE IN THE PHARMACEUTICAL INDUSTRY”
Submitted by Mrs. ARCHANA RAVIKANT WAFGAONKAR was carried out under my supervision/guidance, such material as has been obtained from other sources has been duly acknowledged in the thesis.

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DECLARATION BY THE CANDIDATE

I declare that the thesis entitled “A CRITICAL STUDY OF E-COMMERCE IN THE PHARMACEUTICAL INDUSTRY” submitted by me for the degree of Doctor of Philosophy is the record of work carried out by me during the period 27th February 2009 to 27th February 2014 under the guidance of Prof. Dr. V. D. Nandvadekar and has not formed the basis for the award of any degree, diploma, associate ship, fellowship, titles in this or any other University or other Institution of Higher learning.

I further declare that the material obtained from other sources has been duly acknowledged in the thesis.

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List of Tables

List of Figures

List of graphs

ABBREVIATIONS USED

1.	**B2B**	**Business to Business**
2.	**B2C**	**Business to Customer**
3.	**C2B**	**Consumer to Business**
4.	**G2B**	**Government to Business**
5.	**G2C**	**Government to Consumer**
6.	**C2G**	**Consumer to Government**
7.	**B2G**	**Business to Government**
8.	**B2P**	**Business to Peer**
9.	**C2P**	**Consumer to Peer**
10.	**G2G**	**Government to Government**
11.	**G2P**	**Government to Peer**
12.	**P2B**	**Peer to Business**
13.	**P2C**	**Peer to Customer**
14.	**P2G**	**Peer to Government**
15.	**P2P**	**Peer to Peer**
16.	**C2C**	**Customer To Customer**
17.	**ISO**	**International Standards Organization**
18	**EDI**	**Electronic Data Interchange**
19	**HTTP**	**Hypertext Transfer Protocol**
20	**HTML**	**Hypertext Markup Language**
21	**OLE**	**Object Linking and Embedding**
22	**LAN**	**Local Area Network**
23	**PSTN**	**Public switched telephone network**
24	**RSS**	**Really Simple Syndication**

25	**TAM**	**Technology Acceptance Model**
26	**CD**	**Compact Disk**
27	**PC**	**Personal Computer**
28	**EFT**	**Electronic Fund Transfer**
29	**CCI**	**Communications Commission of India**
30	**ODBC**	**Object Database Connectivity**
31	**ASP**	**Active Server pages**
32	**ISP**	**Internet Service Provider**
33	**VSNL**	**Videsh Sanchar Nigam Limited**
34	**Tbps**	**Tera bits per second**
35	**OECD**	**Organization for Economic co-operation and Development**
36	**ICT**	**Information and communication Technology**
37	**ATM**	**Automatic Teller Machine**
38	**EMT**	**Electronic Money Transfer**
39	**FTT**	**Financial Transactions Terminals**
40	**FSTC**	**Financial Services Technology Consortium**
41	**PIN**	**Personal Identification Number**
42	**SSL**	**Secure Socket Layer**
43	**IDC**	**International Data Corp.**
44	**ERP**	**Enterprise Resource Planning**
45	**CRS**	**Computer Reservation Systems**
46	**SQL**	**Structured Query Language**
47	**IIS**	**Internet Information Server**
48	**MTS**	**Message Telecommunications Service**

49	**COM**	**Component Object Model**
50	**DCOM**	**Distributed Component Object Model**
51	**PDA**	**Personal Digital Assistance Device**
52	**TELCO**	**Tata Engineering and Locomotive Company**
53	**SCM**	**Supply Chain Management**
54	**RCS**	**Revision Control System**
55	**RSA**	**Rivest Shamir Adleman**
56	**ECCRM**	**Electronic Commerce Customer Relationship Management**
57	**NASSCOM**	**National Association of Software and Services Companies**
58	**GAIL**	**optical fibre networks**
59	**IPO**	**Inter Procedural Optimization**
60	**SCM**	**Supply Chain Management**
61	**SME**	**Small and Middle scale enterprises**
62	**UPS**	**Uninterruptible Power Supply**
63	**PCI**	**Peripheral Component Interconnect**
64	**R&D**	**Research and development**
65	**CIS states**	**Commonwealth of Independent States**
66	**CRC Tourism**	**Cooperative Research Centre Tourism**
67	**ICICI**	**Industrial Credit and Investment Corporation of India**
68	**HDFC**	**Housing Development Finance Corporation**
69	**HSBC**	**Hong Kong and Shanghai Banking Corporation**
70	**WLL**	**services telecom players**
71	**NCPA**	**National Community Pharmacists Association**
72	**GIC**	**General Insurance Corporation**

73	**LIC**	**Life Insurance Corporation**
74	**DSS**	**Data Security Standard**
75	**USA**	**United States of America**
76	**US**	**United States**
77	**UK**	**United Kingdom**

CHAPTER 1

INTRODUCTION

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INTRODUCTION

1.1 Definition and meaning of e-commerce

Definition:[1] 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 unable 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 [2]. 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:*[3]**

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 [4]

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 n 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]

LOGICAL LAYERS	SERVICES IN LAYER
Application layer	B2B,B2C,C2C
Middleman Services	Hosting services, value added nets, payment services, Certificates
Secure messaging	Encryption, EDI, Firewalls
World wide web services	HTTP, HTML, XML, OLE Software agents
Logical Network	Intranet, internet, extranet
Physical network	PSTN, LAN, Bridges, routers,

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]

	International E-commerce transactions ($)					% sales
	2000	2001	2002	2003	2004	in 2004
Total($billion)	657.0	1.233.6	2,231.2	3979.7	6,789.8	8.6
North America	509.3	908.6	1,498.2	2,339.0	3,456.4	12.8
United states	488.7	864.1	1411.3	2187.2	3189.0	13.8
Canada	27.4	38.0	68.0	109.6	160.3	9.2
Mexico	3.2	6.6	15.9	42.3	107.0	8.4
Asia Pacific	53.7	117.2	286.6	724.2	1,649.8	8.0
Japan	31.9	64.4	146.8	363.6	880.3	8.4
Australia	5.6	14.0	36.9	96.7	207.6	16.4
Korea	5.6	14.1	39.3	100.5	205.7	16.4
Western Europe	87.4	194.8	422.1	853.3	1,533.2	6.0
Germany	20.6	46.4	102.0	211.1	386.5	6.5
United Kingdom	17.2	38.5	83.2	165.6	288.8	7.1
France	9.9	22.1	49.1	104.8	206.4	5.0
Italy	7.2	15.6	33.8	71.4	142.4	4.3
Netherlands	6.5	14.4	30.7	59.5	98.3	9.2
Latinn America	3.6	6.8	13.7	31.8	81.8	2.4

The following figures of –commerce sales of .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)							
Quarter	Retail Sales (Millions of dollors)		E-commerce as % of total	Percent Charge From Prior Quarter		Percent Charge from Same Quarter A Year ago	
	Total	E-com		Total	E-com	Total	E-com
Adjusted							
3rd quarter 2011(p)	1.052,736	48,244	4.6	1.1	1.9	8.2	13.7
2nd quarter 2011(r)	1,041,406	47,352	4.5	1.1	2.6	8.1	17.2
1st Quarter 2011	1,029,575	46,131	4.5	2.6	3.6	8.6	17.8
4th quarter 2010	1,008,112	44,517	4.4	3.1	4.9	8.1	16.3
3rd Quarter 2010(r)	972,770	42,418	4.4	0.9	4.9	5.9	14.9
Not Adjusted							
3rd Quarter2011(p)	1,049,067	44,495	4.2	-1.1	0.6	8.1	13.4
2nd Quarter 2011(r)	1,061,124	44,224	4.2	10.0	1.2	8.4	17.2
1st Quarter 2011	965,068	43,713	4.5	-8.3	-17.9	8.6	17.6
4th Quarter 2010	1,051,917	53,225	5.1	8.4	35.7	7.8	16.5
3rd Quarter 2010	970,155	39,230	4.0	-0.9	4.0	5.7	14.9

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

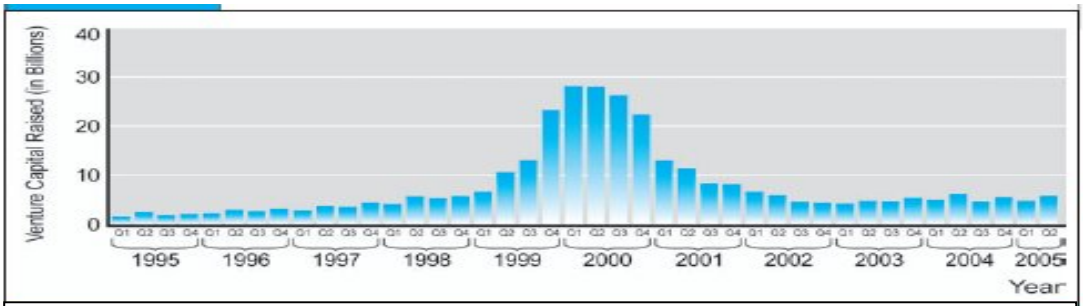
system. This system was used to a large extent before the invention of internet. Electronic Data Interchange (EDI).

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



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 fro 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.

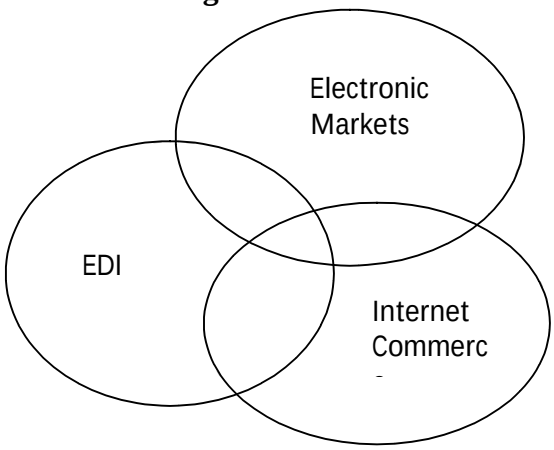
- Electronic Data Interchange (EDI):

  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:[2]

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

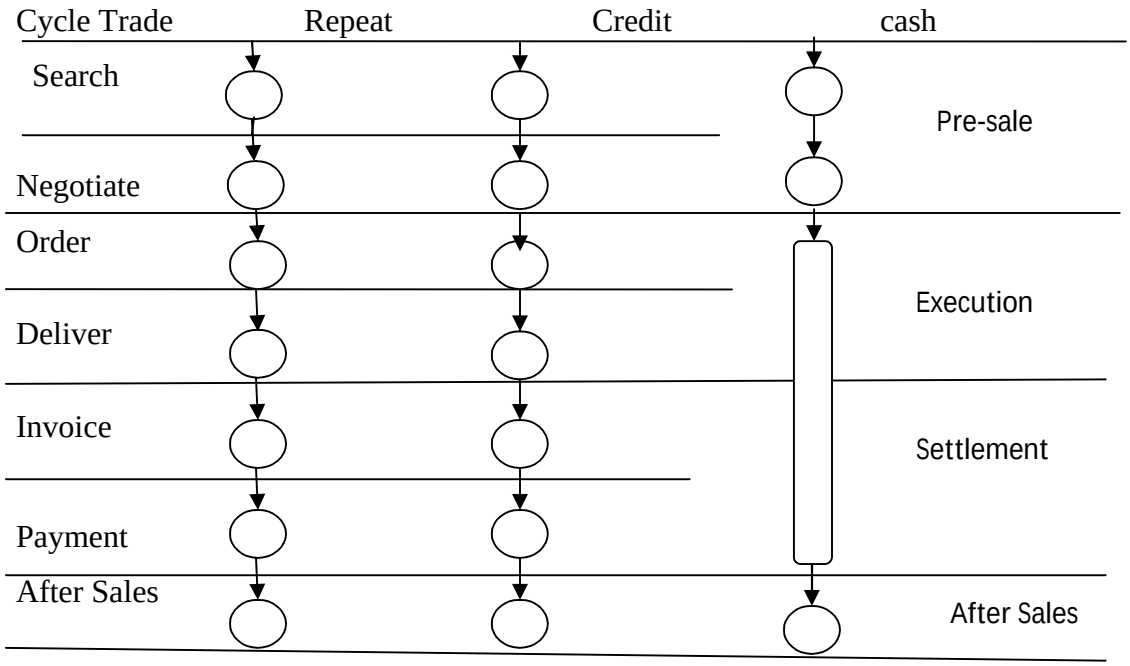
There are various versions of the trade cycles depending upon the online factors above and for many transactions, further complicated by the complexities of international trade. Three general trade cycles are as follows:

- **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



1.9.3 Electronic Market:[2]

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

Communication Functions	It is related with exchange of information or documents for carrying out business transactions. E.g.E-mail
Process Management Function	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.
Service Management Function	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
Transaction Capabilities	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

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 –

Principal business models are –

- Business to business known as B2B
- Business to consumer known as B2C

- Consumer to business known as C2B
- Consumer to consumer known as C2C
- Mobile e-commerce

Table 1.4: Business models of E-commerce

TRANSACTION ORIGINATING FROM AND BEING FULFILLED BY					
TRANSACTION INITIATED & ACCEPTED BY		Business	Consumer	Government	Peer
	Business	B-to-B	B-to-C	B-to-G	B-to-P
	Consumer	C-to-B	C-to-C	C-to-G	C-to-P
	Government	G-to-B	G-to-C	G-to-G	G-to-P
	Peer	P-to-B	P-to-C	P-to-G	P-to-P

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

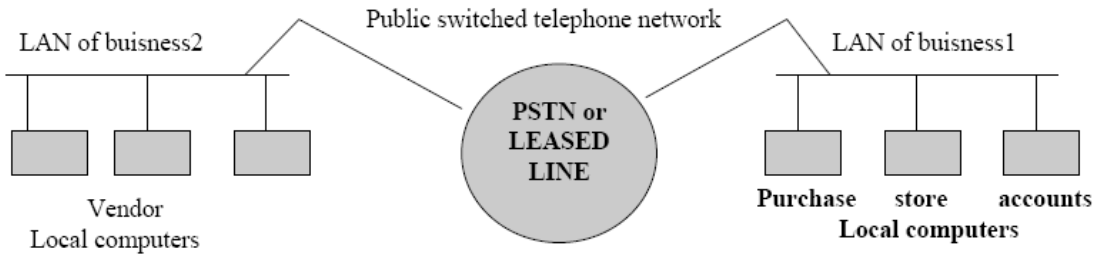
1.13.2 Business to Business (B2B):[8]

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



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. newmarket makers.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:

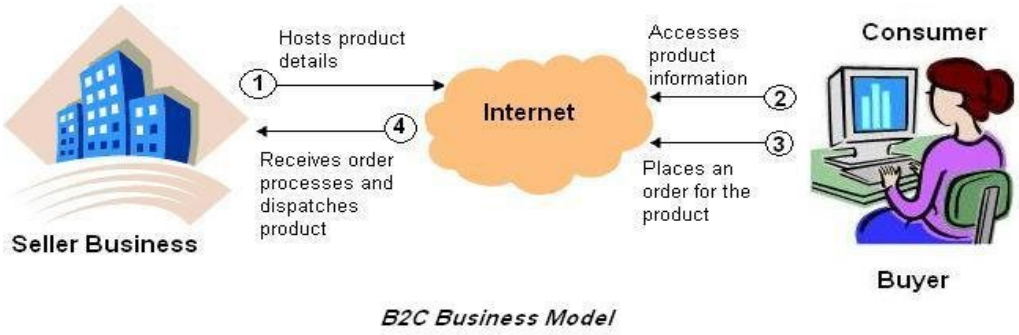
- orders in accurate amount
- orders just in time results in reduction in warehousing
- Improved control of inventories resulting in reduction in energy use and land
- Enhanced quality logistics resulting in less transportation

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



B2C Business Model

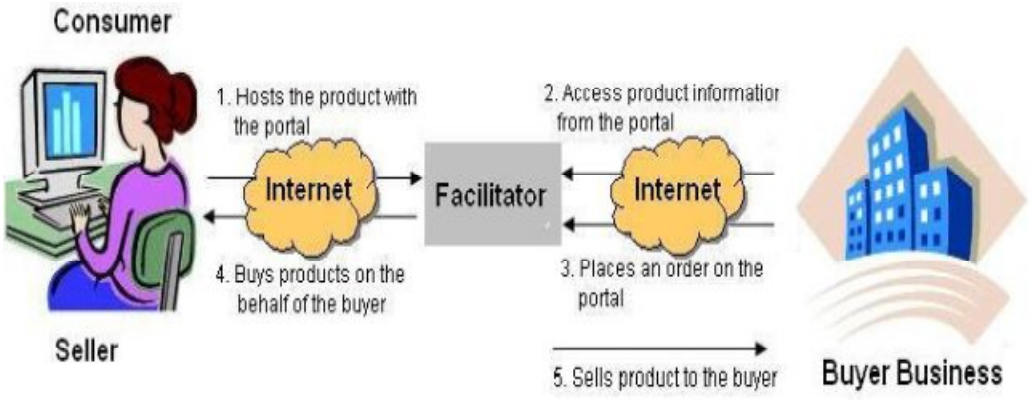
Table 1.5: LIMITATIONS ON THE GROWTH OF B2C E-COMMERCE	
LIMITING FACTOR	COMMENT
Expensive Technology	Using the internet requires $400 PC (minimal) and a connect charge ranging from about $10 to $60 depending on the speed of service.
Sophisticated Skill set	The skills required to make effective use of internet and e-commerce capabilities are far more sophisticated than say television and news papers
Persistent cultural attraction of physical markets and traditional shopping experiences	For many shopping is a cultural and social event where people meet directly with merchants and other consumers. This social experience is not duplicated yet in digital form (although social shopping is a major new development)
Persistent global inequality limiting access to telephones and personal computers	Much of the world's population does not have telephone service, PCs or cell phones

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

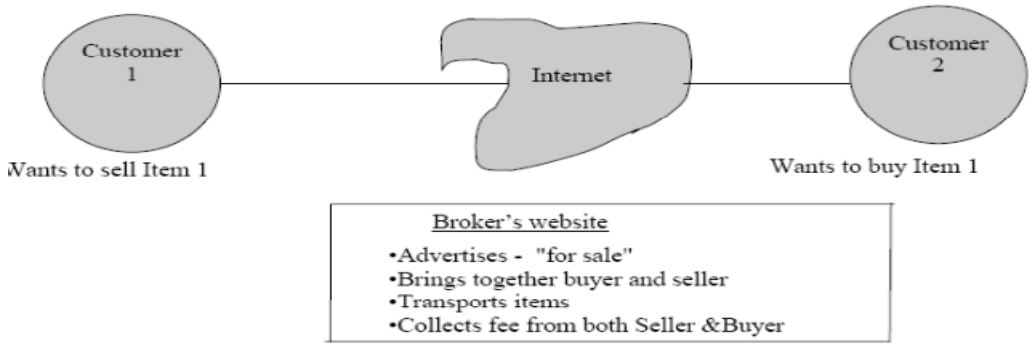


1.13.6 Consumer-to-Consumer (C-to-C):

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.

Figure 1.7: Consumer To Consumer Model



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):[9] 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) 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 [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 [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.

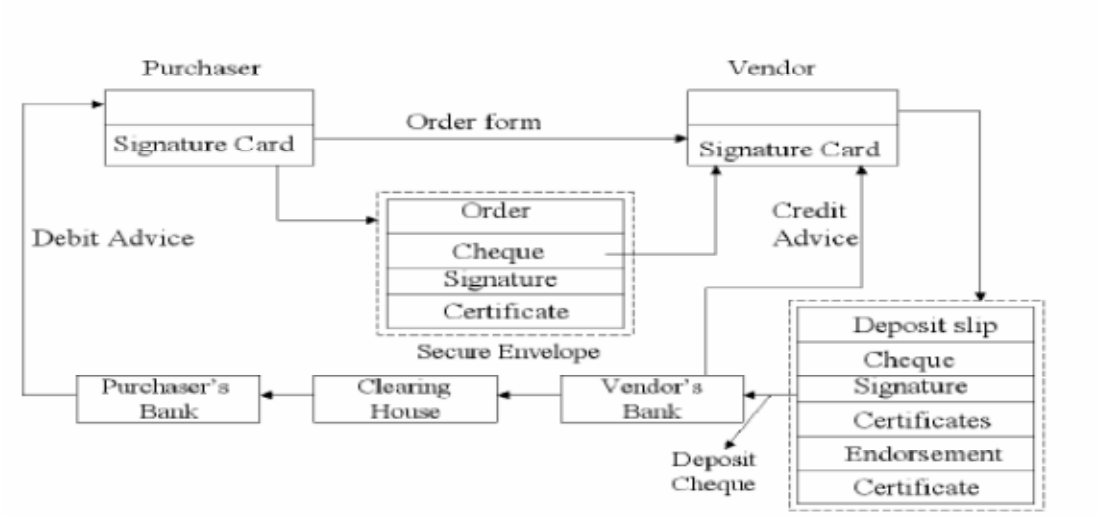
Steps in transaction

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



Payments of Small Amounts on Internet

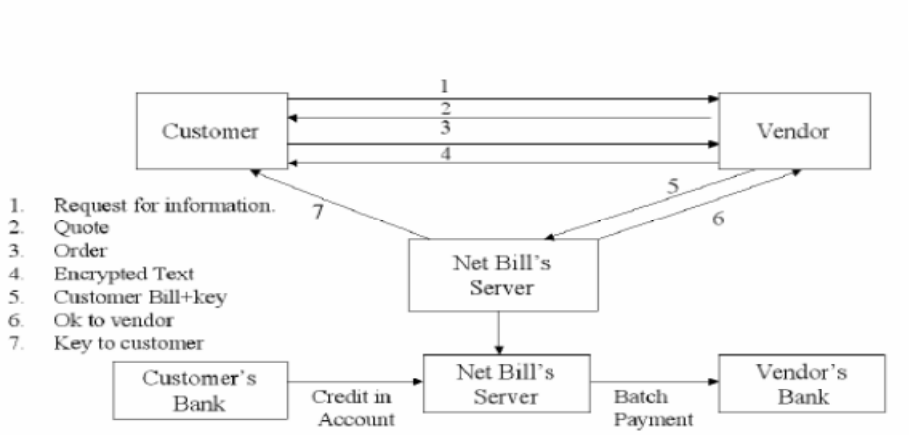
NETBILL'S PROPRIETARY SYSTEM

- 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

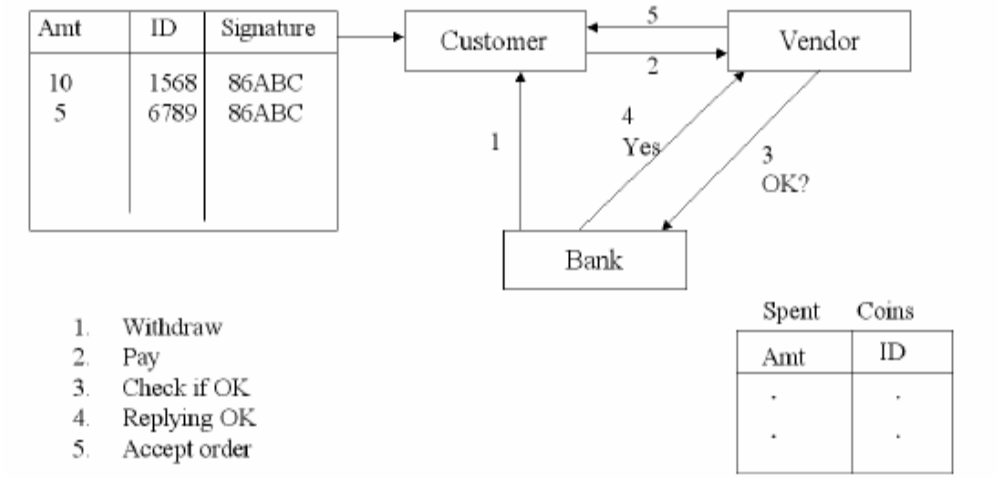
1. Customer withdraws coins in various denominations signed by bank

   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

Figure 1.10: Electronic cash



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

System	Year Founded /description
First Virtual	1994 – 1st secured stored value system based on credit card pre use deposits and pin numbers. Ceased operations in 1998.
Digital Cash (e–cash)	1996 Encryption based stored value system requiring digital wallet on hard drive to store e-coins. Ceased operations in 1998 returned as e-cash
Millicent	1996 Digital equipment Corporation's entry into micro payment e-cash. Now a Compaq platform product with multiple options.
Peer to peer payment Systems	
Paypal	1999 free P2P micropayment system
Yahoo Paydirect	1999. Free Yahoo P2P payment service
Money Zap	1999 Western Union fee-based money transfer system

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 Ecount offers a prepaid debit account. To use Ecount a consumer first establishes an account with Ecount funded by a credit or debit card. Account information is transferred via the web using SSL. Once Ecount 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. Ecount 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

System	Year Founded /Description
Ecount	1998 Prepaid debit account
Monetta Prepaid	2000 Prepaid virtual card that allows consumers to make online payments without using a credit card or bank account digital wallet.
Monetta Debit	2000 Account that allows users to pay fro m existing checking savings online of credit accounts Digital Wallet
eCharge	1997 Prepaid account with digital wallet.
Millicent	1998 Prepaid cards purchased at convenience stores (Japan only)
Smart Cards	
Mondex	1994 smart card stored value system in which value is stored on a chip on a card.
American Express Blue	1999bined credit and smart card

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 -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

	Personal Logic	**Firefly**	**Bargain finder**	**Excite's Jango**	**Kasbah**	**Auction bot**	**Auction web**	**T@T**
1.need Identification								
2.Product brokering	✓	✓		✓				✓
3.Merchant brokering			✓	✓	✓	✓	✓	✓
4.negotiation					✓	✓	✓	✓
5.Payment and delivery								
6.service and evaluation								

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 can not 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 [15].

1.21 Factors Affecting the Growth of Electronic Commerce [14]

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.

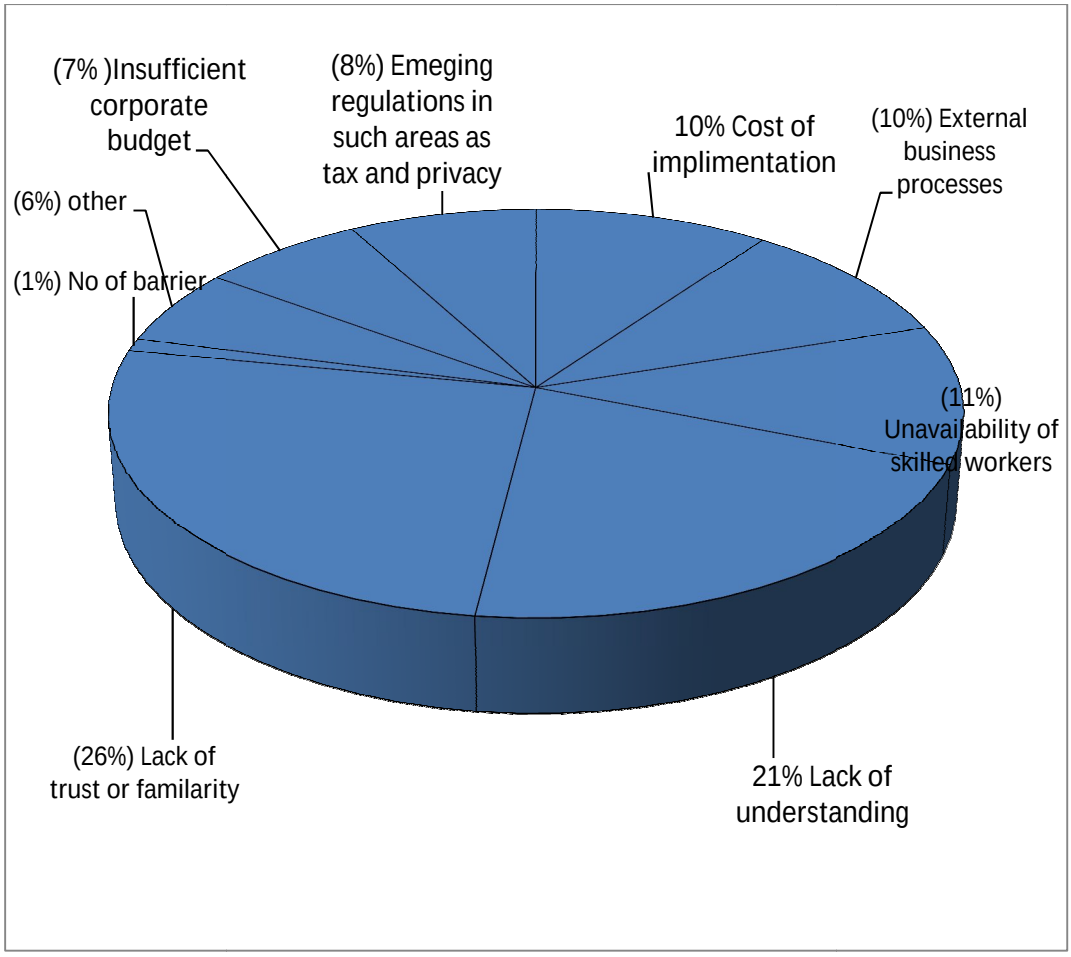
Existing business processes: As many business enterprises are taken over by new dot com companies they have a fear to loose existing market and hence they are making more and more investment.

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 **c**onventional 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

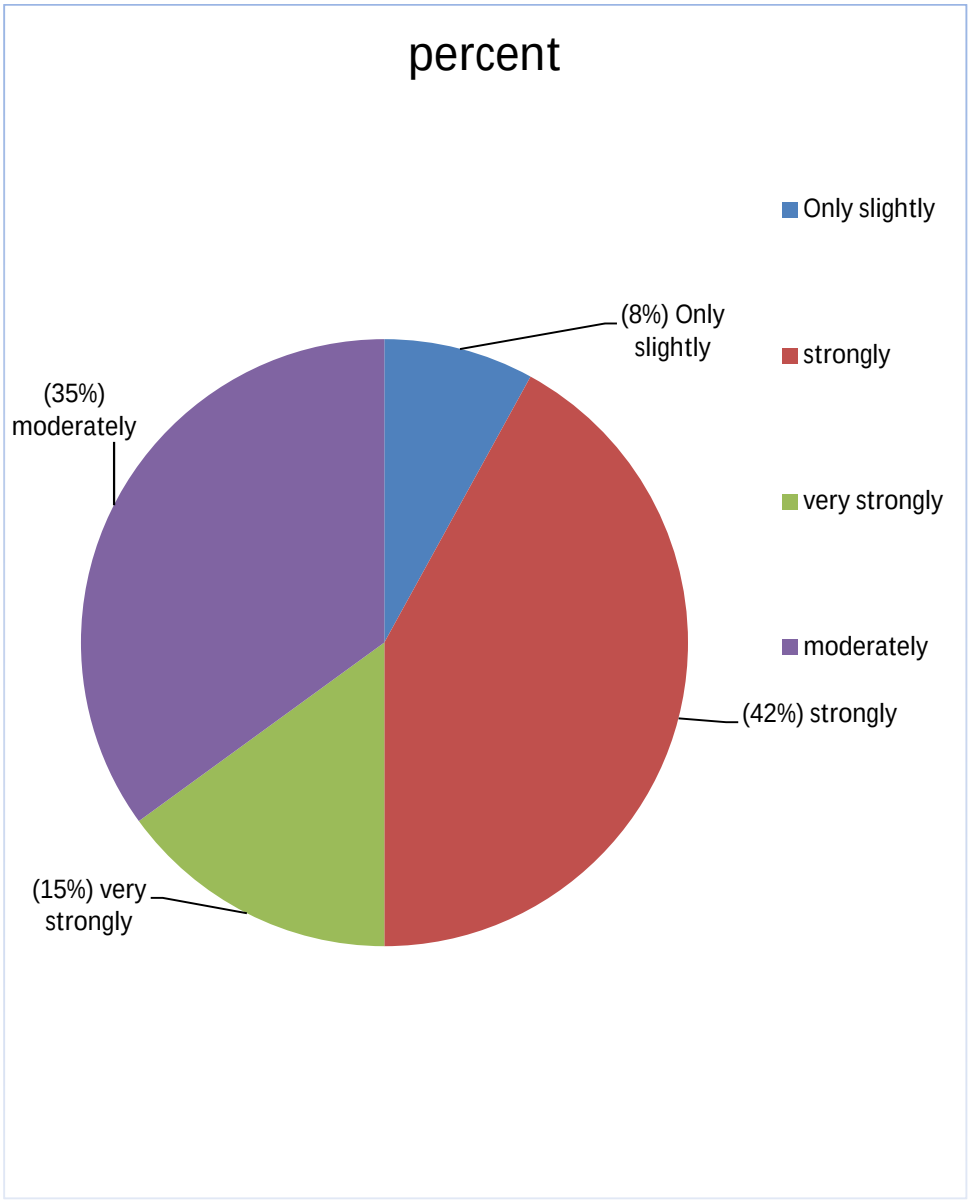


Insufficient Corporate Budget: It is seen that those who want to increase use of e-commerce in their organizations has to tackle the problems such as expenditure for the particular year and the existing IT budgets.

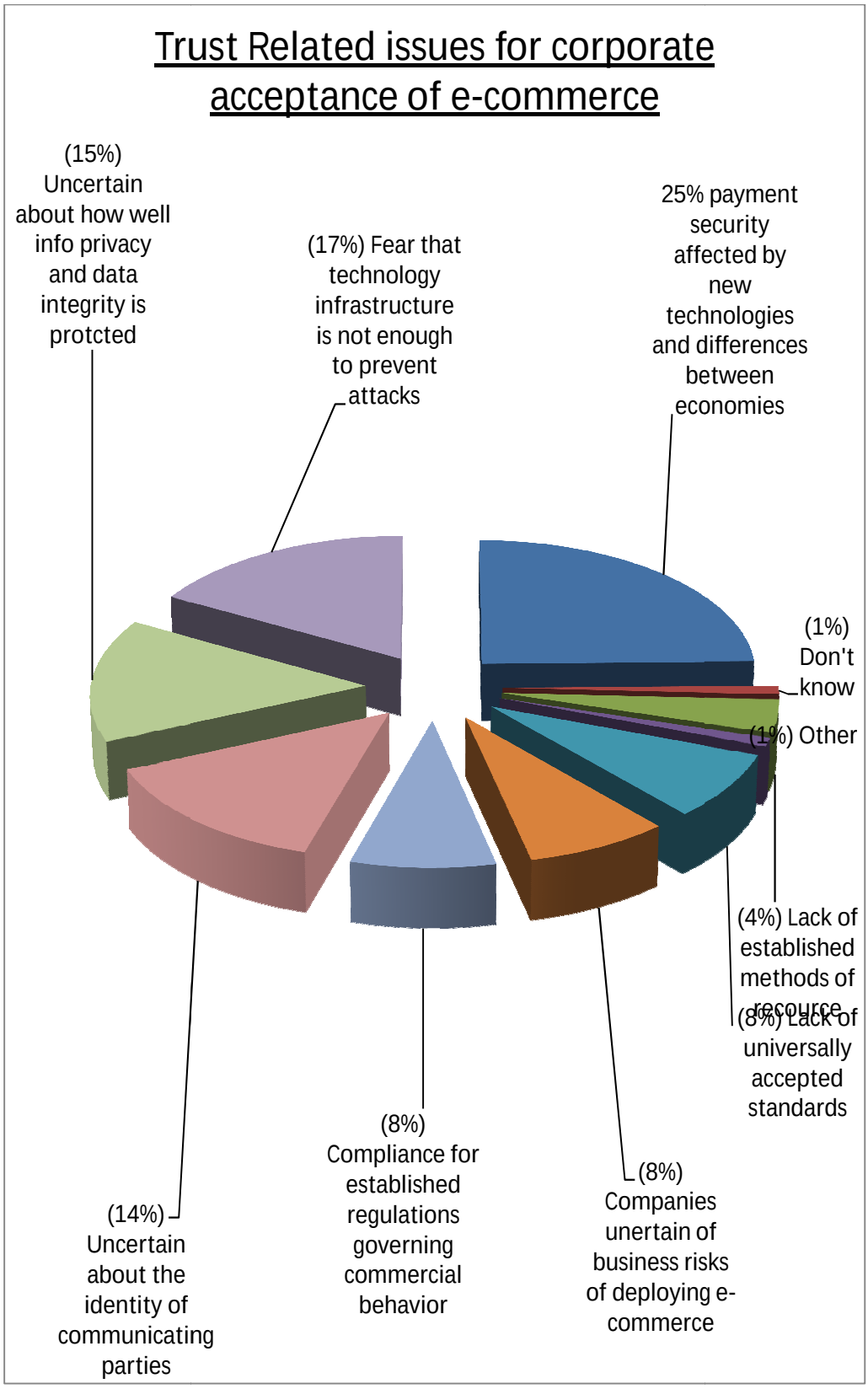
Technology Limitations: The major opposition to the electronic commerce systems comes due to Speed, the reliability and the usability of it. But the survey

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

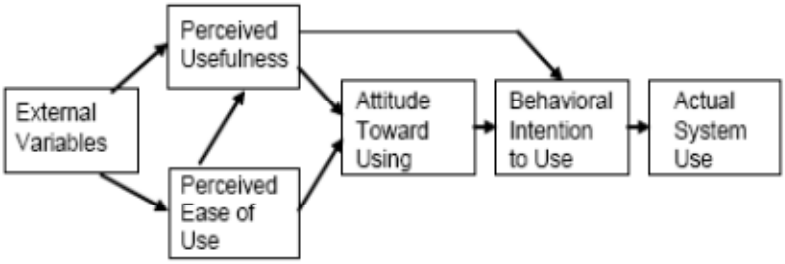


1.22 Limitations of e-commerce:

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

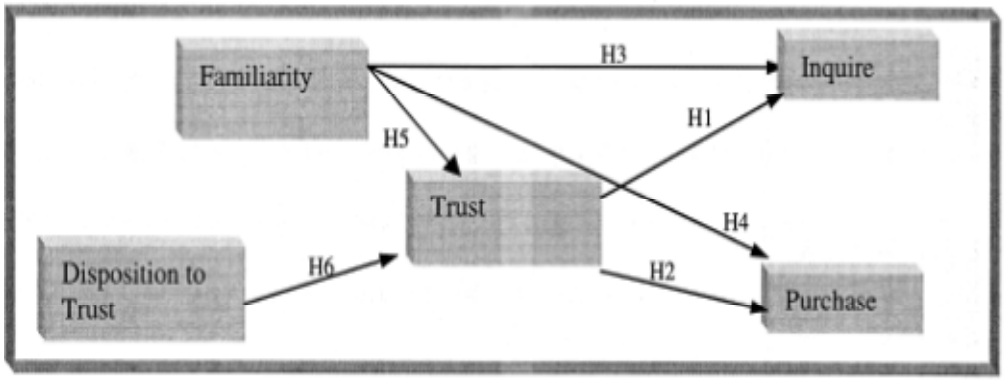
problems such as security of payments, reliability of companies and lack of privacy policy. Trust is an important factor in many social and economic interactions where new technology and important decisions. Trust is also necessary while downloading any important software from net. For e.g. on Amazon.com 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 a 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 1.9: Sales & Use Tax	
Tax System Feature	**Conflicting Internet Feature**
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.	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.
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.	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.
In this type it is necessary to know whether the transferred item is tangible or intangible.	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.
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.	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
As the tax depends upon the location the tax is destination based tax.	This type of tax is not dependant on the location.
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.	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.

Figure 1.12: Familiarity and Trust in E-commerce



• 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 [17]

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 [18]

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 [22]

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

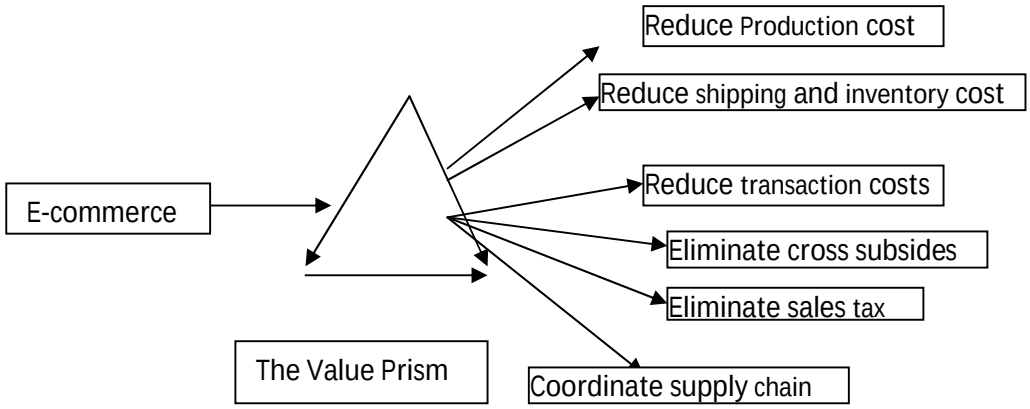


Table 1.10 lists the areas or factors for which e-commerce will be useful and also lists the improvements which should be made in the technology for the changes in the technology. New changes in the technology has made various changes in the working which should be accounted to improve the quality and 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

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

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** – Gobal 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 viendors and payments.

6) **Minimizing Up front cost and Risk** – E-commerce needs sustantial 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 accesible to vendors and buyers and not to competitors. Use of extranet can solve this problem.

8) **Pushing ecommerce to less sofisticated buyers** – Here technology resistant buyers will accept convinience while convinient 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 to grow iternet 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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CHAPTER 2

RESEARCH DESIGN AND METHODOLOGY

2.1 Introduction

The title of the research is “A critical study of e-commerce in the pharmaceutical industry”. As the name suggests study is carried out of the benefits and limitations of e-commerce in the pharmaceutical industry. For the study survey based methodology is used. A survey is carried out of the pharmaceutical industries with the questionnaire to get the information regarding the use of e-commerce, its benefits and the limitations. For sample selection convenience sampling method is used. Researcher obtained the list of pharmaceutical industries in Maharashtra from Maratha Chamber of Commerce library. This list also included addresses, telephone numbers and the name of the website as well as email id for communication of the companies for communication. Some addresses were not correct or some companies were closed forever. The information regarding these companies was obtained from the websites. It was observed that there are maximum number of companies in Mumbai and Pune. There are very few companies which were not located in Mumbai and Pune. Researcher has selected two major cities Mumbai, capital of Maharashtra and Pune city reach for its educational and historical background. It was observed that many companies are having their offices located in major cities like Mumbai and Pune while their factories were located at different places. The kind of information expected from researcher was available with the marketing executives or managers. Researcher wanted to find out what are the areas where e-commerce use is the most and is beneficial. The questionnaires were distributed in different pharmaceutical companies. The information was filled by the employees having enough information about the working of the company. Some questionnaires were filled by sending them using email and discussing them on the telephone. The chapter covers the topics such as selection of sample, sources of primary and secondary data. Primary data is the data obtained from questionnaire which were filled by employees of the pharmaceutical companies. Secondary data is the information about the e-commerce and the information about use of e-commerce in the pharmaceutical industry. The SPSS software and other statistical tools are used for analysis of data.

2.2 Statement of Problem

Introduction of Internet and World Wide Web has bought new methods for carrying out business transactions. Electronic commerce is powerful application of World Wide Web. All the computers are connected to each other by World Wide Web. Intranet is made up of different computers from same organizations. Many such intranets connected to form extranet. Electronic business transactions between different organizations using network connection are cheaper and faster.

U.S. small businesses are major businesses buying and selling on internet. In the year 2004, 2.8 million small businesses spent $25 billion for goods and services over the Internet. B2B consumers have benefited by cost savings due to improved internal operations and efficient trading exchanges. U.S government had four benefits like low rises in the prices, increase in the productivity, increased income and low unemployment rate. California industries are also benefited due to improved salary status of the employees, higher income and sales tax revenues.

A new world of IT has started. New methodologies are being utilized by the governments to cope with the new technologies. Use of internet and e-commerce is growing faster. New business methodologies due to internet are changing the relationships between business, governments and citizens. New developments are carried out in the field of infrastructure and service delivery models. There is a development of complex, legal and technical framework. New businesses should adopt internet and intranet and should reengineer themselves. IT revolution is shifting from traditional business processes to new processes suitable to IT.

E-commerce application is undergoing changes from technology driven to user driven. E-commerce is transforming into communication, strategy and business practices. E-commerce enables exchange of information and execution of transactions between the people and the organizations. EDI (Electronic Data interchange) is used for communication of different business processes between the enterprises. For obtaining maximum benefits from e-commerce many times R&D intensive industries apply new technologies to give tough fight with the

competitors of the market. E-commerce provides the industry with better transactional facilities. E-commerce is highly beneficial to business-to-business applications of pharmaceutical industry when different business groups together want to take some decision. The industry is benefited by e-commerce with the factors such as high value drug improvement, clinical development, marketing and sales and trial, project and human management. This application of e-commerce to the corporate strategy creates is quiet significant to the industry. E-commerce has made three major impacts to the industry -1) clinical development speed is increased 2) there is a increase in share holders value 3) it reduces time required for applications and research. Industry value has been increased due to the application of e-commerce.

A project titled Monash explained about E-commerce implementation in Southern Health network hospital-pharmaceutical supply chain. The success of this project has made many hospitals utilize this project from the Southern Health network.

E-commerce has changed the total working of the businesses. It has speed up many processes. New innovative technologies of e-commerce have changed the working of the different processes. Lot of development is seen due to e-commerce in the pharmaceutical industry too. Every company is having its own website. Communication of the employees, medical representatives and suppliers is through e-mails. It has changed the total working of the pharmaceutical industry. Hence the study should be undertaken to find the benefits of e-commerce in the industry.

Statement of Problem: To study how e-commerce enhances the processes such as marketing and sales, manufacturing, advertising etc. we need to collect the data from each company and we have to do the analysis of the same. Whether there is a computerization in the organization and to what extent is studied. What software's are used by the company? Which processes are used most by the company? Which payment system is used by the company? To study the changes in different processes and to find the benefits and limitations of e-commerce in the pharmaceutical industry, study

is undertaken by the researcher. Problems in different processes should be understood and the solution should be found out.

2.3 Importance of study

The Pharmaceutical industry is the growing Industry making use of e-Commerce. Application of e-commerce and World Wide Web has made many changes in the total working of the industry. There are many changes such that after ten years it will be difficult to recognize the industry says **Ron Dyer** a former technology analyst with Goldman Sachs and market analyst at Schering-Plough, who is now a consultant for Boys' Harbor, a social service agency in New York. Dyer saw the trends like increased business to business transactions over internet in the industry which was unstoppable. For example, direct transport of pharmaceuticals from manufacturer to retailer via supply chain management systems. This is done already to control inventory. Many people are getting their prescriptions and other medical needs filled on the internet. In addition many people are having a lot of information about the drugs and diseases through health related websites. According to Dyer, manufacturers, wholesalers and retailers will do the business transactions online and will increase these transactions online. According to him the manufacturers will arrange chat room sessions and discussion groups to reach the consumers directly to explain about health. Dyer also noted that internet use is getting doubled in 100 days and people are moving from PCs to wireless devices such as PDAs (a device used for prescription). Security is a major problem but it can be overcome with the use of encryption and by awareness of the people for the security of their confidential information. Online ordering by pharmacies will allow entrepreneurial pharmacists to search for cheap suppliers. This will pressurize the margins of the distributors. Also pharmaceutical manufacturers hold large amount of inventory. E-commerce and electronic exchange of data will reduce this as manufacturing and supply flows will be dependant on the actual demand. Even if whole sellers have lagged behind manufacturers, they have online capabilities which can be accessed exclusively by customers and offer direct ordering, sales overviews, new drug information and stock control services.

To study the actual use of e-commerce, how it enhances the actual processes in the pharmaceutical industry. How it really helps in different processes & the stages of the drug marketing. How it helps supply chain management. The interaction with actually involved people in the various companies will make understand the solution properly.

From the above discussion it is clear that the study of this growing field should be done critically & new solutions should be found out. Thus it is important to understand how business transactions are carried out electronically reliably and securely. When designing information systems it is essential to understand the emerging web based transactions. A number of organizations are exploring how to carry out all day-to-day operations electronically using the intranet in a so-called paperless system. It is thus important for a researcher to understand these processes and the benefits of application of these processes.

2.4 Scope of the study

The researcher has used convenience sampling method for choosing a sample of study. As almost all the pharmaceutical companies are situated in Mumbai and Pune and there are very few pharmaceutical companies which are outside Mumbai and Pune. Scope of study is limited to pharmaceutical companies situated in Mumbai and Pune, These two cities had been selected as most of the pharmaceutical companies are situated in Mumbai, capital of Maharashtra and holding the biggest market whereas Pune is one of the major cities and is becoming an IT hub with many international IT companies. The researcher has obtained the list of the pharmaceutical companies from Maratha chamber of commerce library. The list also contained the addresses of the companies, their websites, contact telephone numbers and email id for contact. Researcher wanted to study the benefits and limitations of e-commerce in the pharmaceutical industry. He wanted to study the different processes involved in it. Researcher wanted to know how e-commerce technology is useful to the pharmaceutical industry. For this researcher has prepared a questionnaire to be distributed in different companies to get the required information.

2.5 Objectives of the study

To identify the role of E-Commerce in Pharmaceutical Industry, following were the special objectives kept in mind while carrying out the study:

1. To critically study the benefits of E-commerce in the Pharmaceutical Industry.
2. To understand the need of E-Commerce in this industry.
3. To study the existing E-commerce processes related to this industry.
4. To study the effect of E-Commerce in the areas like marketing, advertising, sales, purchase etc. of this industry.
5. To study the how it enhances the processes of manufacturing & sales of the industry & speeds up the processes.

2.6 Hypotheses of the study

The following hypotheses have been made to study the objectives:-

Hypothesis1: E-commerce enhances the processes of marketing & sales and speeds up the processes of the industry.

Hypothesis2: Most of the pharmaceutical companies use e-commerce.

Hypothesis3: Manual & paper based systems are replaced with e-commerce systems for purpose of cost benefits.

2.7 Research Methodology

This study is related to the e-commerce use, benefits and limitations in the pharmaceutical industry. For selecting the sample of study, researcher had visited Maratha Chamber of Commerce library, Pune and obtained a list of pharmaceutical companies their addresses, telephone numbers, email ids for contact and URLs of the websites. As it was seen from the list most of the pharmaceutical companies are situated in Mumbai, capital of Maharashtra the study was carried out in this city. It was also observed that Pune city has many pharmaceutical industries and hence the study was carried out for this city. Researcher has visited almost all the pharmaceutical companies having correct addresses as the list was not renewed, some address were changed. Also an attempt was made to find the addresses using the websites. Some companies refused to fill the questionnaire form with the fear that the confidential information will be leaked. Hence the number of companies visited were 90 due

to this sample size is 90 companies. This method comes under convenience sampling method which is based on the readymade list of pharmaceutical companies.

2.7.1 Primary Data

Primary data for this research is obtained from survey of different pharmaceutical companies. The survey is carried out by methods such as telephone survey, mail survey, e-mail questionnaire, personal observations and interviews collected from the concerned employees. The researcher had distributed the questionnaires in different companies by hand or by email. All the questionnaires are filled by the concerned employees. Some information was obtained from interviews and discussion with the employees on telephone or by direct visit on the company addresses obtained from Maratha Chamber of Commerce. As explained above the list of pharmaceutical companies is obtained from Maratha Chamber of Commerce. As most of pharmaceutical companies are situated in Mumbai and Pune, a data of questionnaire is obtained by visiting these companies. Total 90 companies' data was obtained. The following steps were undertaken to collect the data –

1) Distributing the questionnaire and getting it filled by the concerned employees. Sending questionnaire by e-mail and by hand was used. In addition finding the majority this method was used to prove the hypothesis

2) Personally visiting the pharmaceutical industries.

3) Telephone and personal interviews.

2.7.2 Secondary Data

Secondary data is the data which is obtained from the websites, books, magazines, journals, news paper clippings etc. The information regarding theoretical background, history, its uses in various areas etc. is obtained. The information about e-commerce, its benefits and limitations is obtained using various sources discussed above.

For collection of secondary data the researcher searched on the different websites on the internet for getting information related to e-commerce. The information of various areas where e-commerce is used is searched. Its

applications, uses, advantages and disadvantages in the areas of pharmaceutical industry as well as in the areas such as agriculture, marketing, banking, education, finance, telecom etc is collected. For collection of information researcher has visited various libraries such as Maratha Chamber of Commerce library, Jaykar Library, Tilak Maharashtra Vidyapith Library, Sinhagad Institute of Management Library all from Pune and Hutatma Rajguru Mahavidyalaya Library,Rajgurunagar etc.

2.7.3 Questionnaire

Questionnaire was designed to collect primary data required using survey of different pharmaceutical companies. These questionnaires were distributed to different companies by directly visiting the pharmaceutical companies or were sent by e-mail to the concerned people or employees. The questionnaire was so designed that it would cover all the information required of the pharmaceutical industry related with e-commerce and the thesis. It covers information such as to what extent e-commerce is used, for what purpose (marketing and sales, advertising, manufacturing etc.), what are the processes involved of e-commerce, what is the payment system used etc. This questionnaire is shown in annexure 1.

2.7.4 Statistical Techniques

Primary data was collected using survey method and using this required data was obtained from various pharmaceutical industries. This data is then analyzed using SPSS (Statistical data for Social Sciences) software package version 19.0. Correlations and graphs are used for the purpose of the analysis. Researcher has used various techniques such as average, percentage, comparison and cross tabulation. Tests such as Z tests, Chi square test, T test and majority methods are used to prove the hypotheses.

2.8 Testing of Hypotheses

The hypotheses has been tested using different statistical tools using SPSS (Statistical Package System Software) and also by majority criteria. I.e. if majority of the respondents in favor of the given hypothesis the hypotheses is considered accepted otherwise it is rejected. In SPSS software researcher has used different tools like chi square test, Z-Test, T-test, frequency and percentage

comparisons, graphs, correlations for the purpose of analysis. First hypotheses has been tested using chi-square test and also by testing of majority percentage of marketing and sales values collected. Second hypothesis has been tested using Z test and the majority percentage of e-commerce use. Third and fourth hypothesis is tested using majority percentage of benefits obtained due to e-commerce use with respect to the factors such as paperless office, required storage space, speed up process, accuracy, clarity and transferrable. Fourth hypothesis is tested by considering the majority of the processes used in that pharmaceutical industry.

2.9 Time Budgeting

The research was started in March, 2009. Synopsis and questionnaire were made. First research paper "D-commerce: A way of Business" was made and was added in the international journal. In 2010 search for secondary data was made and using it chapter one, two and three were written. In the year 2011, survey of all the pharmaceutical companies from Pune and Mumbai was done to collect the primary data. In the year 2012 and 2013 analysis of data and writing of fourth chapter were done. In 2014 all the thesis was rearranged and in February 2014 the thesis was submitted to Tilak Maharashtra Vidyapith.

2.10 Limitations of the study

1] The geographical area covered under study includes pharmaceutical industries in Pune & Mumbai. Hence the finding of the research is restricted to the pharmaceutical industry in Pune and Mumbai region only.

2] The research is based on the opinions and views of the respondents. The opinions may change in future due to changes in market forces and other situational factors.

3] Some companies refused to fill the questionnaire form with the fear that some confidential information will be leaked. So the researcher was unable to collect such information.

4] Some companies filled the questionnaire but gave very little information orally in the interviews. This also limits the research.

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CHAPTER 3

LITERATURE REVIEW

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3.1 Introduction

Internet has brought a lot of change in working of the business. Internet provides free exchange of information. There are 400 millions of computers in different networks worldwide which communicate with each other. Hence internet is major media for marketing and communication. It has brought in to force new business opportunities such as e-business and e-commerce today. [1] By providing better presentation of their product and services small business organizations can be in race with large organizations. Customers can have better choice of product and services worldwide. With the use of electronic data interchange (EDI) buyers and sellers can exchange standard business transactions invoices and purchase orders easily.

Today, the use of e-commerce is done widely in business. In every industry like payment, marketing and advertising or implementation e-commerce is needed. E-commerce use is more in online services. ECCRM literature makes use of a wide range of research methods which tell us how e-commerce is useful in health care industry as compared with other sectors. A Typology and D-commerce Customer Relationships Model assert the need for an interdisciplinary typology of trust to compare and communicate research results more clearly. Computer software programs and automation technology is resulting in improved productivity, better patient education, man and woman power, efficient use of man power and disease management strategies, tighter inventory control and fewer medication errors. This new pharmacy technology is divided into business customer (B2C) and business to business buying and selling (B2B or e-marketing) automation/robotics; and healthcare over the Internet. Online networks connect buyers with sellers, distributors with retailers and retailers with manufacturers to carry out the distribution process effectively. Internet has created a growing and complex healthcare network which connects suppliers with distributors, pharmacists to reach out to suppliers, healthcare provider's information resources

business data sources and the patient/consumer. Americans are using internet to get health care information. A survey conducted by Harris Interactive concludes that more than half of U.S. adults or 114 million people are using the Internet and of that number 86% are surfing for health information. This number has doubled in two years. Most consumers search on regular basis. A survey by Media Cross a marketing consulting firm found that 87% pharmacists have computers and 94% pharmacists use the internet at home. Half of the pharmacists have internet access at work and 63% visited at least one pharmaceutical company's website. More than 60% have completed one CE course online. It was forecasted that 10% of prescriptions will be sent electronically by 2001. For effective transfer of products data sharing between parties in the supply chain is necessary. Research and development in information and communication technology has made it possible to create easy communication links between suppliers, producers, third parties and customers. The common technology to establish electronic link for transferring messages is electronic data interchange. Electronic data interchange is defined as transmission of trade documents electronically using standardized formatting. E-commerce help in high value drug innovation clinical development and trial project and people management marketing and sales. E-commerce and corporate strategy together has created a sound value for the industry. "Pharmaceutical e-Marketing" is a term divided into three categories including doctors and hospitals (the end users). It helps in providing reports and scientific data to the specialists in order to launch a new drug. It is mostly based on providing reports scientific data etc. to the specialists in order to start the promotion of a new drug. Bulk drugs is a new e-marketing strategy used which involves established drugs like antibiotics antipyretic etc. which is not visible to the end user. Second type of the e-marketing used is for anything from a catalogue on the web to the chemical portals.API, a new and exciting area of e-marketing. API's are purely B2B as they are distributed between pharmaceutical companies only. E-business has altered the supply chains to benefit all concerned in supply chain. To acquire a good position on the internet a company needs to have a website running live on World

Wide Web. Also the website should have a website account from any good web hosting company for publishing your site.

Internet gives basic knowledge of the medicines which gives decision making knowledge even if this knowledge can not replace doctors. E-commerce helps in marketing, selling and manufacturing. In addition it helps in education and library and reduces processing time and cost which will be useful in future for the industry.

3.1.1 ROLE OF E-MARKETING IN PHARMACEUTICAL BUSINESS [2]

Pharmaceutical marketing is different than other businesses due to the sales of drugs which can not be sold directly to the patients but instead they are targeted to the health care professionals or the doctors who prescribe the drug to the patient. Internet and different technologies has brought new opportunities and can expand company's reach. For example a popular video on U tube may be seen by thousands of people. Internet also brings new styles of communication Interactive and customer responsive campaign can be created with the help of internet. For the promotion of drug, ***detailing*** is the method in which sales representative directly contact the doctors. Drug companies from Europe and North America are increasingly adopting ***electronic detailing*** as the process to market their products. It includes diverse strategies, such as videoconferencing, the provision of electronic education modules, and the use of email and related technologies as prompts and to promote two-way communications. But it is not very popular with all doctors but it is cheaper than traditional sales representatives. Top companies are providing financial incentives for doctors to participate in e-detailing, such as honoraria, product samples, practice tools, and patient education resources. In the USA, Pfizer runs such a program (www.get-quit.com) for providing regular e-mails and personalized web pages to support their product use. Wyeth Consumer Health Care website (www.caltrate.com.au) helps in the disease osteoporosis and encourages people to see a doctor if they answer yes to any questions on a one minute risk test'. Use of e-detailing can make the companies work in a timely and effective manner. The use of it can make Australians and all other country people can access blogs and websites promoting prescription, medicines and other

products, and even selling them. Safety concerns have been raised about the purchase of prescription, non-prescription and complementary medicines over the internet. Pharmaceutical companies also are seeking to capitalize on medical social networking sites. For example Pfizer is collaborating with Sermo Inc a web company where thousands of doctors are discussing diagnostic and treatment issues in anonymous postings. Search engine marketing can be one of the methods for online client achievement. It has unbelievable return on investment and is faster. But it has limitations like cyber crime and problems like – you can not touch or smell the product due to security problems customer can not purchase what he has ordered etc. Pharmaceutical E-marketing has many problems such as –

- E-marketing requires customers to use newer technologies.
- Low speed internet connections
- Big websites connected to dial up networks
- Inability of shoppers to touch, smell, taste or try on tangible goods before making an online purchase.
- Cyber crime – customers are unable to get what they had ordered.
- Some online companies sell information about their customers.
- Low e-marketing education

E-marketing Uses: 1) one to one approach with the customer can be made using internet. 2) Appeal to special interests 3) Geo- targeting – method of determining the physical location such as country, state and city etc.4) Availability of cheap production inputs 5) Growing affluence.

3.1.2 E-commerce in European Pharmaceutical Industry [1] – The pharmaceutical sector of European Community comprises of wide range of products such as pharmaceutical products, medicinal and botanical chemicals and the manufacture of soaps, detergents and other cleaning and polishing products. In 2005 the cost of the global pharmaceutical sector was €454.87 billion ($565.90 billion) at factory prices. The North American market (USA and Canada) is the largest in the world with the 47% market share. Bu in the year 2005 the European market overcome the American market. Its share was 7.1% in Europe in comparison with 5.2% in

North America. The European pharmaceutical industry gives vital contribution to EU economically at the same time provides with high quality employment and investment in scientific capability and public health. It is a leading industry and a driving force for the whole world. It is research focused and one of the high tech sectors and a key asset to the European economy. These sectors are listed as under The European pharmaceutical market (2003)

Pharmaceutical market at factory prices	Approx. €110 billion
Pharmaceutical market at retail prices	Approx. €170 billion

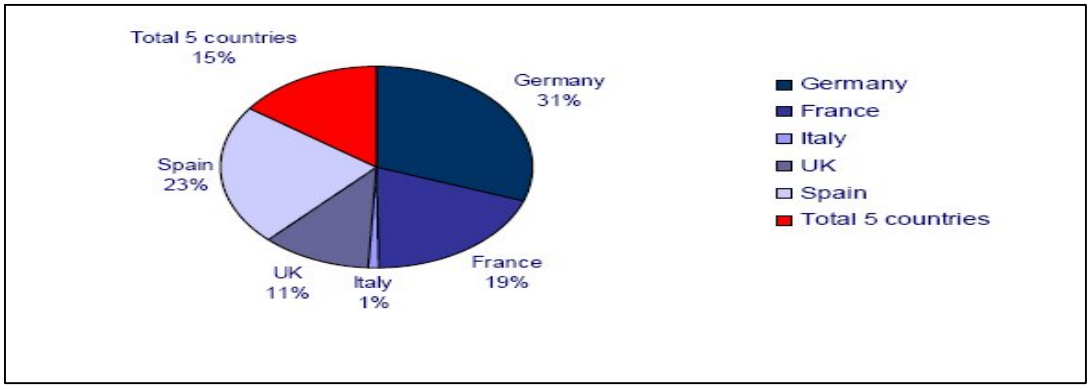
Statistics on the EU pharmaceutical sector (2004)

Value of production	Approx. €160 billion
Value of exports	Approx. €95 billion
Trade balance	> €30 billion (surplus)
Employment	580,000-600,000

Europe is a major exporter of medicines. In 2004, the European pharmaceutical sector's production was €32.2 billion. In last 15 years it has increased from €7.1 billion in 1990 to €32.2 billion in 2004. Three leading trade members performed 87.6% of its imports in 2004 and acquired 55.8% of its exports.

But from the figures of recent years, there is slowdown in the sector. Out of the five big European pharmaceutical markets, four have recorded equal or lower growth than the previous year (UK, Italy, Spain and France). Only Germany is growing faster after the frozen price period which began in 2004.

Graph 3.1 Evolution of pharmaceutical market in leading European Countries (2005/04) Variation (%)



Even if the sector's strength is best, Europe's leadership position is lowered. In 1992 six out of every 10 best selling medicines came from Europe in comparison with four out of ten from the USA. But from 2002 80% came from USA and only 20% came from Europe. In order to acquire number one position On 1 June 2005, Günter Verheugen, Vice-president of the Commission declared a new industrial strategy for the sector based on three key elements competitiveness, innovation and patients. Within three years new programs will be launched for these areas which will make progress in growth and employment and will implement European public health strategy.

These sector's statistics are as follows:

Table 3.1: Research and development in the EU pharmaceutical sector

Number of people employed in pharmaceutical R&D	More than 100,000
Contribution to the EU's R&D expenditure	Approx. 10%
R&D expenditure	Approx. €20 billion

In European Union there are total 1,815 laboratories in pharmaceutical sector which had sales in excess of €109 billion in 2004. The sector is having 530,000 employees and there production exceeds €144 billion. Germany is the major market for employment as well as imports and exports.

Table 3.2: General data for the EU pharmaceutical sector (2004)

Country	N^0 Labs (*)	Production **(€ millions) (**)**	Employ	Int. sales **(€ millions)**	Imports **(€millions)**	Exports **(€millions)**
Germany	310	20,893	114,20	21,551	21,991	27,333
Austria	105	1597	9523	2312	2996	2,875
Belgium	140	4,799	27,185	3,539	23,316	24,599
Denmark	41	4,593	16,759	1,410	1,734	4,525
Spain	239	90,656	39,000	10671	6,716	3,999
Finland	64	724	6,648	1,689	1,283	490
France	257	33,141	99,400	22,760	12,963	17,196
Greece	65	449	11,300	3,468	2,254	677
Holland	48	5,660	16,000	3,579	8,241	8,989
Ireland	56	15,866	22,500	1,306	1,988	15,156
Italy	213	17,742	73,266	15,195	10,448	9,060
Portugal	141	1,590	10,717	2,879	1,597	308
United	74	22,555	73,000	16,110	12,742	18,207
Sweden	62	5,565	20,100	2,608	1,999	5,791
Total	1,81	144,830	539,59	109,077	113,448	139,205

There is improvement in the productivity with the use of advanced computer programs and automation technology. With the help of this man and woman can use pharmacy more efficiently by improvement in the patient education, more effective disease management strategies, improved inventory control and less medication errors which have also improved the relationship between the pharmacists, physicians and patients. The technology has moved from logistics (distribution of drug products) to management of patient's drug needs. This technology is divided into e-commerce B2C business to customer and business to business (B2B or e-marketing) buying and selling, automation/robotics; and healthcare Over the Internet.

3.1.3 B2C e-commerce in pharmacy [3]

As given by the United States Pharmacopeia Drug Information Volume I for off-label uses, a website named Wikipeda which is used by user for the drug information and MDR traditionally edited website for pharmacy practice. Wikipidia provided literally accurate information which was not complete and contained errors of omission and hence was with limited scope than MDR.

These websites help in changing the attitude of the customer towards the use of the medicines and in turn help in consumer management for their own help. Healthcare professionals should take active part in Wikipedia and should invest time for such websites which are also supported by the fellow practitioners such as RxWiki (www.rxwiki.com) and PubDrug() and MediPedia (www.medipedia.com). Online programs are provided by Microsoft at the San Jose Children's Musical Theatre and University of Washington's Do-IT project for helping children with illness and disabilities which help them to remain connected with their counsellors and the world. Internet helps these children to reach out beyond their isolated environments.

3.1.4 e-commerce/B2B

Online networks help in connecting buyers with sellers, distributors with retailers and retailers with manufacturers and also speed up the distribution process. It was forecasted that U.S. B2B sales will reach $2.7 trillion by 2004, while 80% of

businesses will be buying online and there will be 30% sellers online. B2B changes the infrastructure by making change in the supply chains organization and the way of exchange of goods and services. For example one company names RxBazaar.com is open for business for all the 24 hours and offers one stop shopping for short dated troubled products. It relates buyers and sellers of heath related items overstocks over a secured site. **Internet has generated a growing and complex healthcare network providing connectivity which enables communication between pharmacists and suppliers, other healthcare information resources, business data resources and patient /consumer.** Schering Report XXII forecasted that in 2004 the online pharmacy sales will reach $20 to $25 billion in 2004 up from $1.9 billion in 1999. According to NCPA report for internet retailers it has signed more than 1000 pharmacies.

Schering Report XXII predicted that in 2004, online pharmacy sales will reach $20 to $25 billion from $1.9 billion in 1999.According to NCPA reports that 1000 pharmacies have signed as a internal retailers for this organization for example, cornerDrugstore.com

The pharmaceutical sector is able to use electronic business tools because of certain properties which support B2B relations (business to business) for buyers and sellers. Many products which are sold are highly standardized and have simple description. The specific challenge faced by pharmaceutical sector is managing product recall is supportive association along the whole value chain which increases the use of commercial and communication platforms in these sectors. Pharmaceutical sector is global as the companies have to either manufacture or sell in the various international markets.

The buying and selling of pharmaceutical companies is online. Nearly 40% companies use internet or other IT networks for purchasing goods or services. This figure is slightly lower than other subjective sectors. Not only the large companies but also the small companies prefer online purchase. There are 30% companies with 1-9 employees which are doing online purchases. Online purchasing is still limited. Only 7% of the pharmaceutical companies in the EU-7

purchase more than 25 % of their supplies online which is equal to the ten sectors which were surveyed.

Table 3.3: Online purchases and use of specific IT solutions in e-procurement

Weighting:	**Online purchases**	**Purchase > 5% of their supplies online**	**Purchase > 25% of their supplies online**
Pharmaceutical firms (EU-7)	38	19	7
1-9 employees	34	19	9
10-49 employees	44	19	3
50-249 employees	47	19	5
250+ employees	49	31	8
Germany	41	29	5
Spain	35	19	0
France	37	12	7
Italy	27	9	4
United kingdom	64	40	21
Czechoslovakia	62	27	12
Poland	34	17	10
Total(10 sectors, EU-7)	45	25	10
Base(100%)		All	

The following table shows revealing data about the specific tasks that the sector uses IT applications for. Finding suppliers, managing requests for quotes or prices (RFQs / RFPs) and making orders are the principal uses when purchasing via internet (e-procurement).

SME's are having advantage of their size. They are more flexible because of this they remain ahead in the competition. Due to this it becomes easy for them to refocus the business such as producing natural cosmetic products or drugs of special kind. These activities are easy on internet and have the advantage of low cost and global coverage. Client relations are developed by SME's using electronic business tools like corporate website. Fundamental information is used

for client relations. Client relations are usually focused on the problems and budgets of large companies. Client relationships can also be managed using client database. Hence it is concluded that SME's can use IT and internet based solutions for communicating with the business partners which helps them in sharing capacity and improving their competitive positions against the compotators. Internet can be used as a base for supplier services and electronic business tools. Cost of implementation can be shared and purchasing power is increased.

Table 3.4: IT Applications in Business

	Finding suppliers	Managing RfQs/RfPs	Product orders	Manage online auctions	Invoicing suppliers	Expenditure analysis
Weighting:		%of companies	%of companies	%of companies	%of companies	%of companies
Pharmaceutical firms (EU-7)	10	9	10	2	5	6
1-9 employees	9	8	7	1	4	4
1049 employees	9	9	9	1	3	4
50-249 employees	12	11	15	3	10	10
250+ employees	19	17	27	10	23	26
Total (10 Sectors, EU-7)	8	7	9	3	6	5
Base (100%)	All companies					

Where "% of companies" = % of companies as legal entities independent of size.
RfQ = Request for Quote; RfP = Request for Price

Insufficient use of electronic business tools is the biggest problem in some small pharmaceutical companies. These tools may be installed but the company may be lacking the knowledge to use them. As the software suppliers only design the ERP or CRM systems for large companies if the small companies use the software of big companies they have the have a problem of using complex and improper IT systems in terms of size and deal with problems that are not relevant to their companies. The technological advances like development of ICT and e-business can be useful to large companies and may not fulfill the needs of small companies. Such advances are only carried out for large companies.

3.1.5 The pharmaceutical E-marketplaces [4]

B2B portals of pharmaceutical sector contain the directories of suppliers and products. This list is used by pharmaceutical companies to know manufacturers and distributors for the products such as laboratory equipment and materials, packaging and software created for specialized sector. Also manufacturing subcontractors and research project companies that carry out clinical surveys also use these directories on the B2B portals and offer their services. In addition pharmaceutical companies advertise their products using B2B portals. Portals offer large coverage to small companies and distribution network for specialist suppliers. For pharmaceutical and health care sector there are 29 active markets in the e-Market services directory of electronic market. From the following graph it is clear that North America has more B2B markets (15) and Spain is having 4 B2B markets.

Graph 3.2: Geographical Scope of electronic B2B markets in Pharmaceutical Sector

Table 3.5: Directory of electronic markets of E-Market Services [1]

Electronic Market	Geographical scope	URL	Available languages
Auctionmart.com	USA	auctionmart.com	English
Biolab Direct	New Zealand	biolabdirect.co.nz	English
Bioresearch Online	Global, focused on North America	bioresearchonline.com	English
BioSupplyNet	North America	biosupplynet.com	English
Broadlane	USA	broadlane.com	English
Comfort Online	Global	comfortonline.it	English, Italian
Drug Discovery Online	Global, focused on North America	drugdiscoveryonline.com	English
E-Dental.com	Global, focused on	e-dental.com	English

	North America		
e-opti	Italy	e-opti.com	Italian
Global Healthcare Exchange	Global	ghx.com	English, germany
Home Health provider.com	North America	Homehealthprovider.com	English
Labx	85% users from North America, the global user base includes Europe, Asia, central and South America and Australia	labx.com	English
Long Term Care Provider.com	Global, focused on North America	longtermcareprovider.com	English
MaterialSanitario.com	Spain and the Spanish speaking South American countries	materialsanitario.com	Spanish
Med2Med	Global, focused on Germany	med2med.net	English, Germany
Medbuy	Canada	medbuy.com	English
MedequipB2B.com	Asian supplies, but global purchases	medequipb2b.com	English
Medical Design Online	Global, focused on North America	medicaldesignonline.com	English
Medical Virtual Market	Spain	medicalym.com	spanish
Medicforma	Germany and Austria	medicforma.de	German
Nurses.com	Global, focused on North America	nurses.com	English
Optical Auctions	Global, focused on North America	opticalauctions.com	English
Pharmaceutical Online	Global, focused on North America	pharmaceuticalonline.com	English
Plazasalud24	Spain	plazasalud24.com	Spanish
Quiminet	Latin America, Spain, Brazil and USA	quiminet.com	Spanish
Safety Online	Global focused on North America	safetyonline.com	English
Saniline	Spain	saniline.com	Spanish
Solumed.com	Global focused on USA	solumed.com	English
UKprocure	United Kingdom	ukprocure.com	English

Source: Emarketservices.com

Most of the e-market places are used by companies which sell or distribute the products for hospitals and clinics. Health centers can be the clients of such type of markets. The products like medical and pharmacy related items such as surgical instruments, laboratory equipment, healthcare and pharmaceutical materials, and all types of related products and services may be sold using e-market.

Summary

Computer software programs and automation technology is resulting in improved productivity, better patient education, man and woman power, efficient use of man power and disease management strategies, tighter inventory control and fewer medication errors.

Internet has created a growing and complex healthcare network which connects suppliers with distributors, pharmacists to reach out to suppliers, healthcare provider's information resources business data sources and the patient/consumer. E-business has altered the supply chains to benefit all concerned in supply chain. To acquire a good position on the internet a company needs to have a website running live on World Wide Web. Also the website should have a website account from any good web hosting company for publishing your site. The European pharmaceutical industry gives vital contribution to EU economically at the same time provides with high quality employment and investment in scientific capability and public health. The technology has moved from logistics (distribution of drug products) to management of patient's drug needs. The buying and selling of pharmaceutical companies is online. Nearly 40% companies use internet or other IT networks for purchasing goods or services. Insufficient use of electronic business tools is the biggest problem in some small pharmaceutical companies. The technological advances like development of ICT and e-business can be useful to large companies but may not fulfill the needs of small companies.

3.2 E-commerce in Telecom Developments: [5]

Telecom sector liberalization has improved in last five years. Telecom services were first controlled by government till 1994 but they were also opened for the private sector. According to the National Telecom Policy announced in 1994 policy making functions of the government were separated from those of service

providers which in turn provided telecom services to the private sector. Independent Telecom Regulator was established for the same. As a result many private companies were given licenses for providing mobile telephone services and in recent years for fixed line telephone services licenses were given. Private operators were allowed to set up international gateways.

The policy was further liberalized in 1999. The Department of Telecommunications which was providing telecom services as a sole monopoly was corporatized in the year 2000 and was made to compete with the private sector on a level playing field. The National Long Distance Services on the domestic routes, that were the sole monopoly of the government, were also opened to the private sector. The public and private companies like Power grid, railways and gas authorities which are the backbone networks are permitted to set up national long distance carriers for data transmission. A large data communication backbone with extremely high bandwidth is under construction. In January 2001, the government covered unrestricted competition in basic phone services. This helped in finding the telecom companies which can offer services like basic, cellular, Internet, national long distance and broadband to the customers with flexible rate and single billing. In local loop (WLL) services, the basic telecom players are also allowed to offer wireless mobile.

The telecom policy also combines different media and allows direct inter-connectivity among service providers. For voice, data and information services two ways communication is allowed. A cable service provider can get a license as a fixed service provider. The convergence Bill is introduced in the Parliament which is making the union. This helps in increasing union between telecom, IT and broadcasting services. The Communications Convergence Bill, sets up Communications Commission of India (CCI) which promotes the plurality of different media, forms and structure. It also provides access to different competing view points and information resources. It also regulates new activities in the era of convergence.

These telecom policies have had a positive effect in the incoming years. The density of telecom industry grew to 5 percent in September 2002 and will

grow to 7 percent by the year 2005 and to 15% by 2010. In rural area it is expected to grow from the current level to 0.8 percent to 4 percent by 2010. The use of mobile phone is increasing and the number of mobile phones has reached 8.5 million. During last two years the telecom sector had an investment in the range of $ 4.5 to 5 billion by the government and its agencies. By 2005, there will be the requirement of US$ 37 billion investment which will rise up to US$ 69 billion in the year 2010 (Department of Telecommunication, India, 2001; and *Indian Express* [Bombay], 7 June 2001). Many private companies have set up fiber optic networks at the national level to connect the major cities and also have provided trunk routes for providing all kinds of services. Numbers of companies have also created international gateways for providing bandwidth to ISPs. Private sector companies like Reliance Telecom, Powergrid Corporation, Railways, Bharti Telecom, BPL and GAIL are setting cross-country optical fiber networks for broadband services. Non telecom players likeEnron, Zee TV, and Spectranet are also investing a large amount in the broadband sector. A huge investment of about 318 billion is made in the year 2001. Also there is vast investment in international connectivity. Videsh Sanchar Nigam Ltd. (VSNL) which was owned by government invested Rs 109 billion for a bandwidth of 59 gigabits per second (Gbps).

In 2002, VSNL and Hindustan Teleprinters are privatized. To set up a bandwidth of 16.08 tera-bits per second (Tbps) Bharti Telecom, Dishnet DSL has invested US$ 1.4 billion which will connect India with the world through Singapore, Jakarta, Guam, Portland, Los Angels, Hawaii and Japan. Reliance Telecom and Tata Access have plans to provide international connectivity in the future. Broadband access is provided is provided by many companies over cable. TV can be used as a internet device with the use of set top box and cable modems. All the major cities are having fiber optic networks to provide cable TV services, and broadband Internet. The existing 98 million TV sets can be used for accessing Internet.

Internet connectivity has grown due to the number of ISP's which have come into existence due to the above policies. Over 175 ISP's are working in the country

which are responsible for half a million three years ago to 3.5 million by September 2002. Each internet connection is used by number of users. Total numbers of internet users are 17 million. By 2005, internet connections will grow up to 25 million and number of users would grow above 100 million.

The NASSCOM survey estimates that there are total 400 cities which are having 2000 internet connections. This figure would double in the next one year. This rate shows that internet is used from metros to small cities and towns in the country. In India the bandwidth of internet is 10 Gbps. By 2004 it was expected to reach 100 Gbps. In the year 2005 it was expected that the data transfer rate would account from 5percent to 50 percent and further it would increase to 65 percent. Wireless, broadband and convergence of media are the types of networks are used in order to fulfill the internet need of the people.

Summary

With the advances in the telecomm technologies broadband access is provided by many companies over cable. TV can be used as a internet device with the use of set top box and cable modems. All the major cities are having fiber optic networks to provide cable TV services, and broadband Internet. TV sets can be used for accessing Internet. Internet connectivity has grown due to the number of ISP's which have come into existence due to the above policies. Wireless, broadband and convergence of media are the types of networks are used in order to fulfill the internet need of the people. Increase in the internet speed will result in increased use of e-commerce in all the fields throughout the world.

3.3 E-commerce in Insurance Industry: [6]

Insurance industry is also using e-commerce at a high rate. Also there are web brokers like insweb.com, quotessmith.com, quicken.com etc. which offer quotation and simple products in life and non life segments.

In 1996 International Intelligence unit, New York carried out a survey and released the research paper titled 'Global insurance in the 21st century'. A survey was done of 3500 senior executives in 9 countries over North America, Europe, Australia, New Zealand and Japan. The paper predicts that by the beginning of the millennium over 40% consumers will use e-channel for

purchasing instruments which are not very complex. Keeping in mind online customer's choice, the insurers have made big agreements on following services.

- Acceptance of quotation over web (70% concurrence)
- . Payment of premium on line using secured lines (65%)
- . Get product information (63%)
- Comparison of products and offerings across providers (61%)
- . Enquiry about policy information and updating the information (58%)
- Getting financial service experts advice regarding human insurance (55%)
- Claim status of query (54%)

3.3.1 Indian Context

In India insurance companies lack infrastructure and legal framework for computerization which strengthen the business by adding value added services. E-distribution will not work due to the lack of infrastructure in India. GIC and LIC will also have the same problem. Insurance contracts have their area of expertise and they follow the principles of life insurance and are having good faith which gives responsibility of material fact on the proposer. E-distribution of insurance is complex just like online retailing of goods because of the non flexibility of procedures and application of the industry. Insurance industry may have following benefits with the use of Information Technology -

- . Brochureware- Company information its services and offerings and views which are presented over the web.
- . Enquiry over web- It is more effective and fast than brochure ware. By this answers to the queries of the customers can be given.
- . Transaction using dedicated lines- Using these channels field staff and insurer's agents communicate with the company and customers.
- Product Sale on the web- It includes placing an order and buy insurance over the web. Shopping cart and online payment are the additional facilities provided on the web. For product sale e-commerce helps in cost reduction, fast connection to markets, best service and customer convenience.

- Customized product sale over the web- The product can be configured depending upon the user's choice and convenience. Customer profile and demographics will be the added advantages.
- One online request could generate series of actions which would be differing in their comfort integration of the web with their host system. In addition sale of simple product does not have any problem but complex product sale may create problems legally, technically and in regulatory framework.

3.3.2 Security in Insurance

Security is a major problem when e-commerce is applied to the insurance field.

The main areas where the problem is prevalent are -

1) Electronic documents as well are paper based orders can be modified easily without leaving any trace. It is necessary to have manual as well as technical control over the documents to make e-commerce successful.
2) Buying online is not preferred by people because of its security and privacy problems. 43% Indians buy online. Credit card is not preferred instead of that VPP and fax is preferred because of its number.
3) Electronic transfer requires giving transaction details, utilization and storage information. It is needed to keep Insurance information is kept private which is not possible with electronic transfer.
4) Payment on Web: Under the existing Insurance act, Sec 64 VB, it is a rule to give cash before cover. It is not possible with e-distribution as transactions can not be settled and payment in installments can not be done on internet.
5) To make online payment technology is present but there is no infrastructure for financial intermediaries. For the success of e-cash, cyber cash, digital cash proper technology and infrastructure should be present. New methods such as automatic clearance house should be adapted for e-commerce to be successful in insurance industry.

   In the developing field like electronic commerce the regulations are not properly applied due to that whether self regulation is sufficient or needs further extension with the state authority will be decided in future. Use of internet has crossed the

national boundaries and should clear issues such as tariff regime, jurisdiction, Intellectual property rights etc.

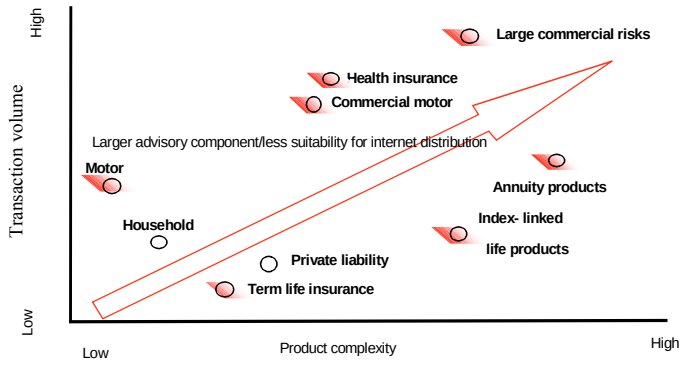
For this physical, legal and financial structure should be changed. Risks and new challenges should not be bothered. Regulation of e-distribution of insurance should be carried out carefully. Organization for Economic co-operation and Development (OECD) and Consumer International are trying to offer the required protection. The future of e-commerce is bright.

3.3.3 E-business trends in insurance

1. Online distribution of insurance policies will grow

It is difficult to sell the insurance product online because they are less standardised quite complex and purchased infrequently. Also there is a need for explanation to sell the product. In spite of the above problems, insurance industry is expected to get one fourth of the market shares.

Graph 3.3: Determinants of suitability for online distribution: transaction vs. Complexity



Source: Swiss Re, Sigma No. 5/2000

2. The internet –is not just a distribution channel but a lot more than it

Internet use in the insurance industry is not only distribution but its effect is also seen on the all other production areas.

- Internet can be used for marketing
- Online support benefits Policy management or resolution of claims.

- Brokers can contact many clients and then can forward the information to the insurer.

3.3.4 E-business models

Several new business models and insurance distribution models as well as new business models for the complete value chain have emerged with the changes in the technology. Nearly all insurers have a website for company information its products and contact details.

Different business models for Internet distribution are being developed

Table 3.6: Business models for Internet distribution

Model category	Business models	Examples
Insurance company websites	Online sale of traditional products	renins.com,GeneraLife.com WebInsurance.com Progressive.com
Financial portals	Portals for financial services and/or insurance	Wingspan.com,Ilife.com eBanka.com (planned)
Point-of-sale portals	Websites linked to specific events	AutoByTel.com BabyCenter.com
Aggregators	Independent price comparisons	InsWeb.com,Quicken.com Quotesmith.com QuickQuote.com LowestPremium.com EHealthInsurance.com Einsurance.de
Online risk markets	Online markets for exchanging risks or entire risk portfolios	GRX.com, CATEX.com CreditEx.com TradeWeather.com
Reverse auctions	Insurance clients put their requirements out to tender	insureXL.de

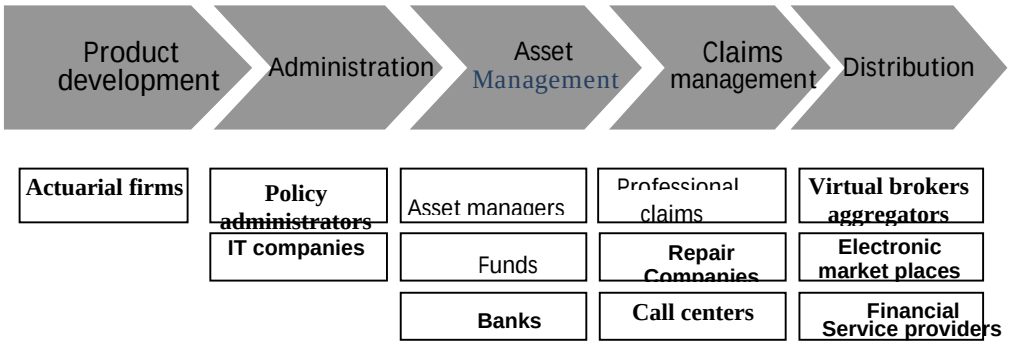
E-business leads to computerization and leads to the break-up of the value chain

Due to the change in the technology stages of insurance have reduced. Insurers can outsource individual functions to the expert providers.

In the B2B segment, in particular, business models that simplify the administration of insurance policies have emerged. Winterthur-Columna, for example, has developed a system that allows medium-sized companies to administer their own pension scheme contracts, with the insurer automatically adjusting the premiums and benefits. In addition to allowing flexible and easier administration of policies the Internet also allows insurance companies to

consider outsourcing the complete administration process. The US Company Mynd, for example, provides various back office functions for insurers.

Figure 3.1 Specialised providers exist in virtually all steps of the value chain



Insurers also use internet for reporting of claims. Clients can keep a watch on the progress of claims settlement online. Not only the insurance websites but also several specialised companies offer such possibilities. A german company Decra, in the field of examining the technical security of cars, offers insurers to manage their motor claims online. On this website, insurers, lawyers, clients and garages also can access the information of their claims settlement and can manage their claims. Another example is Cybersettle, A company from US which deals with liability claims, tries to settle disputes between lawyers and insurance companies regarding the same. Lawyers and loss adjusters submit their proposals keeping the confidentiality of it on internet. Company then checks for the proposals of both the sides and tries to do the settlement. It is a binding on the participants to accept the negotiation in the settlement.

Another interesting development has started by some companies like east in Europe or Genera Life in the US. They sale traditional insurance using internet and carry out outsourcing using e-business technology. Remaining work is given to expertise companies. The goal is efficiency and providing additional service to

the customers. Even if such companies have not acquired major market share they have established connection with many insurers.

3.3.5 How does e-business affect competition?

1) *E-business lowers market entry barriers*

As big investment is not needed, internet can be accessed fast and required product and price information can be obtained easily.

2) The Internet provides saving potential in all fields of the business process

Internet providers save the cost of – 1) expenses on the insurers 2) distribution of insurance 3) paying claims 4) Policy advisers and claims settlement 5) save commission of brokers and agents by selling policies online. Risk selection is improved due to better data analysis and also claim settlement cost is reduced due to the detection of insurance fraud and tighter control by partner companies.

3) Considerable margin pressure on traditional insurers

Online insurers can provide insurance for the lower price this makes traditional insurers also to reduce their premiums.

The insurance industry is more developed in Western than in Central and Eastern European countries. The proportion of income spent on nonlife insurance is 55% where as life business expenditure is 15%, less than 1% of income on an average in these countries. Insurance industry is at the primitive stage in the CIS states and most of the southeastern European countries.

Insurance industry is recovering from the crisis of the transformation crisis at the beginning of the 1990s and enjoying the dynamic growth. Insurance sector growth is increasing in the ten countries in the EU and these are- Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia. Recreation of the Reform of the administrative framework is being taken up in these countries amongst them Hungary and Poland are the most advanced countries. Development of efficient insurance sector in the CIS and few southeastern European countries is very difficult. Considerable improvement should be made in controlling conditions and the investment environment. Improvement should be done in the areas like compulsory motor third party

liability insurance, reduction in the capital requirements, effective control on insurance companies and minimization of market entry restrictions for foreign investors.

With this better quality global insurance plays an important role in establishing an effective insurance sector. Even if the market conditions are liberalized opening an insurance market is a controversial issue. The countries which have opted for EU membership is mostly liberalized still restrictions still exist for the foreign insurers in CIS. With the development in the opportunities such as liberalized market entry and the privatization of previous state control foreign insurers have rapidly increased their activities in Central and Eastern Europe. More than half of the insurance market has been controlled by foreign insurers in some Eastern and Central European countries (e.g Poland and Hungary) as well as in the Baltic States. Where as local insurers dominate the market in the CIS states and in most southeastern European countries. This is because of the market entry restrictions and the higher risk of investing in these markets.

The structural change in the insurance industry totally depends upon the factors such as globalization, IT progress to increase risk transfer efficiency. E-business reduces costs and market entry barriers and breaks up traditional insurance value chain which results in greater transparency, lower prices and improved services in sales and claims management.

Alert and positioned providers and also other sectors will be the providers of new business prospect. E-business activities have already started in central and eastern Europe. Indian insurance companies are in a position to compare themselves with the western insurance companies because of the better management quality and sophistication of IT systems in last 10 years. In Western Europe traditional insurers will face competition with the insurers using new technologies to offer lower priced online insurance. Considerable improvement should be made in controlling conditions and the investment environment. Improvement should be done in the areas like compulsory motor third party liability insurance, reduction in the capital requirements, effective control on

insurance companies and minimization of market entry restrictions for foreign investors.

Summary:

As less investment is needed for the use of internet, e-business reduces market entry barriers. Due to change in technology insurance stages are reduced. Insurers can outsource individual functions to the expert providers. New business and insurance models have emerged with the use of e-commerce. Nearly all the insurers are having website. The development in the insurance industry depends upon the factors such as globalization and progress in IT. E-business reduces cost and market entry barriers and breaks up traditional insurance value chain resulting in greater transparency, lower prices and improved services in sales and claims management. Internet providers save the cost of – 1) expenses on the insurers 2) distribution of insurance 3) paying claims 4) Policy advisers and claims settlement 5) save commission of brokers and agents by selling policies online. Online insurers can provide insurance for the lower price this makes traditional insurers also to reduce their premiums. Due to less investment e-business lowers market entry barriers. Improvement should be done in the areas like compulsory motor third party liability insurance, reduction in the capital requirements, effective control on insurance companies and minimization of market entry restrictions for foreign investors.

3.4 Hotel and hospitality industry [7]

On line travel booking system is a quiet successful industry online and is a hottest Internet-based professional field, even if many dot-com industries have faded up during last few years. *Travelocity* is a company which is continuously developing new online travel booking services and thus has acquired number one position in the industry. Firm's business and operational strategies are well matched with the business model and the future is also bright with the use of internet. To remain number one company should expand its e-business globally. It should expand its business in Asia and Eastern Europe. The key advantages of the travel industry are -

a) Online reservation is faster and easy.

b) Use of internet increases the customer-business relationship.

c) Savings in time due to direct viewing of the price list instead of doing a phone call.

d) Just by clicking a button customer can have a look at wide range of products.

e) E-commerce makes it is possible to cover the market widely. International hotels can expand the business due to the global coverage of the internet across the world.

f) E-commerce technology is quiet effective for promotion of product and services as it saves cost and time to do advertising and creates a brand image worldwide.

For example ***Hilton Hotel*** [8] implemented electronic ticketing schemes for booking rooms and meeting facilities. Another example is of Adlon Hotel which has utilized a website that can take care of specific international languages such as German, French and Italian. In addition it supports Spanish Portuguese and Scandinavian languages and English. In addition this type of multilingual website has reduced the amount of advertising using the mainstream media

3.4.1 E-BOOKING IN THE HOSPITALITY INDUSTRY [9]

Online booking of tickets of hotel/motel, airlines, travel packages, etc. is increasing these days at a high speed. From 1999 to 2002 online hotel room booking has increased six times. It has been increased from $1.1 billions in 1999 to $6.3 billions in 2002. i.e. it has increased from about 2% in 1999 to 9% in 2002. In the year it has reached $15.8 billions in 2005 and account for 20% of total annual bookings. Online bookings are done mostly by business travelers and vacationers who are travelling more than other publics. These online bookers claim that they save money by doing online booking than traditional phone booking and old style travel agents. For e.g. booking of a high end hotel room in New York City under $200/night. The hotel industry is fully aware of these trends and wants to expand its efforts in this field. Even if pressure of selling the rooms online will be there, to make a success industry has developed its new strategy in the emerging market channel.

All the hotels are using online ticket booking system by using a website which bargains hunters other than though an Internet travel agency. In the year 2002,

51% of the total annual online bookings of $6.3 billions were done through the use of hotel's own website. 49% remaining bookings were done through online travel agencies. This has increased the control of hotels over the room booking. In addition there is no need of taking help of travel agencies which make a profit of 15% to 30%. There fore hotels can offer more competitive rates on their own websites to compete with online travel agencies and can give more priority to their own websites rather than travel agencies websites.

In the year 2002, e-booking of airline tickets done was 26% of the total annual sales but only 13% of the hotel room booking was done online out of the total annual hotel room bookings. Currently two out of three rooms are booked using traditional telephone reservation systems.

3.4.2 Summary:

All the hotels are using online ticket booking system by using a website which bargains hunters other than though an Internet travel agency. Online booking of tickets of hotel/motel, airlines, travel packages, etc. is increasing these days at a high speed. From 1999 to 2002 online hotel room booking has increased six times. Multilingual website of the hotels has reduced the amount of advertising using the mainstream media. E-commerce technology is quiet effective for promotion of product and services as it saves cost and time to do advertising and creates a brand image worldwide. On line travel booking system is a quiet successful industry online and is a hottest Internet-based professional field. Advantages of the travel industry are – 1) faster and easy reservation 2) increase in the customer business relationships due to internet 3) global coverage.

3.5 Travel & Tourism:[10]

3.5.1 E-commerce in travel and Tourism

Internet provides tourism industry businesses of all sizes and opportunities for tourism and enhances the relationship with the customers. Regional economy is supported by small and medium sized tourism firms which make up the majority of the tourism industry. We now have a global economy, in which information and communication technology and e-commerce is used, the impact of which is seen on the different industries, regions and firms. Economic agents operate in

global networks of interaction. E-commerce is used for connection, electronic data interchange and transaction capacity with the use of internet and network technologies and it is related to the size and nature of the firm. It also depends upon the firm's awareness of affordability and opportunity for their business. If the number of parties involved are more, there will be greater chance of forming relationships, greater no of transactions and more benefits. Addition of ICT and internet, which are the new communication technologies, has improved regional development and also global forces. Australian tourism SMEs have less awareness of the network technologies usage and effectiveness and hence they lag behind in adaption of e-commerce. Hence they can not cope with the new ICT driven sector due to the shortage of requirements and preparedness.

Introduction of the network technologies in the business has put a pressure on the tourism industry to make use of internet for marketing and transaction purpose. Once the person gets the through knowledge of the internet, his expectations about internet are increased in terms of viewing and purchasing tourism and travel products online. Consumers having knowledge of ICT expect more from internet and search for information, books local and regional travel, tours and accommodation via the Internet. Consumers also can purchase tourism and travel products online. For completion of this demands traditional marketing channels such as brochures, billboards and stands at trade shows and their conventional tourism product distribution channels such as the use of travel agents, destination marketing organizations and travel wholesalers should be expanded to use internet for business to consumer.

To satisfy that demand, tourism firms of all sizes may need to expand their traditional marketing channels (for example brochures, billboards and stands at trade shows) and their conventional tourism product distribution channels (such as the use of travel agents, destination marketing organizations and travel wholesalers) to include the Internet for business-to-consumer.

The internet gives the tourism industry B2C opportunities and helps to develop and enhance the relationships with their customers. There is a lot of scope for commercial travel and tourism on the internet which gives rise to new market. For

example the big websites such as Expedia and Travelocity are mainly the booking systems for air, hotel, car and vacation packages. This websites offer web based sales and provide customer services and fulfill all the requirements of a traveler. These web sites are run by large operators which exclude small tourism product providers. Also they restrict access to small tourism firms and customer to customer access. Tourism industry all over the world is made up of small and medium sized tourism firms (tourism SMEs). Small and medium size tourism enterprises which belong to local industrialists run most of the accommodation establishments worldwide. Regional economy is mostly supported by tourism SMEs and micro tourism enterprises in many regions. As a result there is a increase in the interest in regional economies and online technologies for development, marketing and distribution of regional tourism products. Regional policy makers think that ICT and online technology implementation should be motivated in order to improve the effectiveness of the small tourism firm. There is a tremendous change in the way people book their vacations and do bookings for air, bus and cars for travelling because of the internet or 'e-age'. Considering this the Scottish Tourist Board has increased budget by 25% in order to speed up Scottish tourism in the year 2000/01. Connectivity is the major hurdle in using ICT and e-commerce for small tourism enterprises. The small firms are not giving priority to uptake the technology. Even if many of the customers of the micro and small tourism enterprises are tourists, they still consider themselves outside the tourist's value chain. Small tourism firms often lack the time, skills, financial resources and manpower which is needed for the implementation of ICT and e-commerce. Therefore they lag behind in the competition with the large firms. Small enterprises are individual and need to concentrate on the operational running of their business because of that they fail to concentrate on marketing planning and online business transaction and approach market from direct contact with their guests. Owners of tourism SME's depend upon the ICT expertise and hence they are afraid of losing control and therefore resist for the new technological change. In addition, SME's are located in the area where ICT

infrastructure, mainly broadband can be poor and more expensive and due to limited demand.

There is a fear of tourism SMEs getting isolated and out of touch with changing marketing and e-commerce dynamics due to the lack of the expertise and the resources for e-business. Even if use of ICT for small regional tourism firms finds difficult, still there is a little hope. Apart from their sizes or locations there are many competent entrepreneurs who will be making use of opportunities of the internet. An English study surveyed that there are independent micro firms were among the most creative users of ICT. In addition, the level of ICT usage was found higher than expected even though the problems in adoption of ICT. Even if this is encouraging a recent survey of tourism SMEs in the European hotel sector reveals that small tourism firms are not using information technology for e-commerce purposes (Collins, Buhalis, & Peters, 2003). It is clear that e-commerce uses need a lot of support and encouragement for the e-commerce growth (CRC Tourism, 1999). Australian research points out that regional tourism firms need support and training for e-commerce utilization.

Tourism SMEs will be facing different levels of digital literacy and will have to understand strength of interactive communication tools. For understanding e-business three important properties needed are awareness, confidence and competence. E-business adoption in tourism SME's is possible only when SMEs consider e-business as a part of their daily business routines.

Many small tourism firms e-commerce is new to operate and ICT is also unknown to them. Training should be given for the barriers and challenges for online adoption for the small tourism business owner – operators. Initial efforts for small tourism firms lies in the exposing of ICT language, lowering connectivity cost increasing online visibility and gaining trust in and recognizing the value of new technology tools. Capacity improvement will create awareness among individual operators and will reduce isolation and maintain core market reach in rapidly changing market. By adopting e-markets and training will give support towards regional partnership building.

Capacity of SME individually can be built to help create e-business awareness among individual operators and will reduce isolation. It will also change core market economy rapidly. Destination and Regional partnership building can be generated by training and by increase in the access of the market (Braun, 2004)..

New emerging technologies and their regional development models will increase competition and regional improvements by linking stake holders in networks (OECD, 2001). Destinations which join together ICT based networking and cooperative marketing strategies which create tourism SME networks will also reduce SME isolation and bring tourism. Cyber customers and SMEs make cyber customers to buy products from smaller suppliers. By increasing skills and by making partnership between small tourism firms and regional e-business experts issues like regional product development and global customer can be resolved.

Many regional tourism SMEs have already started using network technologies and strategies partners to take advantage of the technology and avoid loss due to competition on the network. Survey conducted in England states that the respondents from both the macro (destination) level and individual SME level indicated that there are lot of benefits in web technologies for joint marketing and saving new business (Main, 1999).

One British study explained that local tourism operators find the shared destination website attractive (Evans et al., 2001). There are examples of creation of destination website in tourism on the global network. As networking is at its peak, the new opportunities exist to cultivate new culture of connectivity between tourism but it is not possible in every region. Systematically implanted culture of competition and independence will not allow the building of the network (Buhalis & Cooper, 1998). It is seen that tourism SMEs show unwillingness for joining a network. There fore an attempt should be made to promote network formation where SMEs are not interested in using internet and in the areas which are geographically dispersed. Firm to firm relationships can be developed by attending seminars, association meetings and participating in online chats.

Once the tourism SMEs are adopting online local and regional relationships the new incremental and more formal levels communication can be adopted like web

portals. Web portals and introduction of new network for communication can be generated. Portal platform will help to improve e-business. Cost offers also should be checked. Proper training and strategic planning will improve the tourism business on the network. Information should be exchanged by different SMEs to save time and money and improve market visibility and regional strategic power. It shows that structure of network and the connections between different SME's are not in good condition.

Importance of Electronic commerce is well known to all the businesses, for successful business operations other businesses also should adopt the same technology and should use the trends in it and maintain their business success. Search engines on the internet are of great help in the hotel and the hospitality sectors. For example search engine RezTrip provides a booking solution for hotel websites. Its market oriented design gives better conversation ratios (5%) than other booking engines (2%). *RezTrip shows that it continues to pitch the hotel rooms and ancillary products after the visitor has left the room. It also counts the number of pages viewed or the amount of time spend on the website.* **Virtual Social Networking is the one in which** individuals and organizations are linked by one or more specific types of interdependency like values, vision, friendship, business ideals religion etc. Virtual social websites help in this type of networking.

3.5.2 Summary:

Internet provides tourism industry businesses of all sizes and opportunities for tourism and enhances the relationship with the customers. Addition of ICT and internet, which are the new communication technologies, has improved regional development and also global forces. The internet gives the tourism industry B2C opportunities and helps to develop and enhance the relationships with their customers. ICT and online technology implementation should be motivated in order to improve the effectiveness of the small tourism firm. It is clear that e-commerce uses need a lot of support and encouragement for the e-commerce growth (CRC Tourism, 1999). Australian research points out that regional tourism firms need support and training for e-commerce utilization. An attempt should be

made to promote network formation where SMEs are not interested in using internet and in the areas which are geographically dispersed. Proper training and strategic planning will improve the tourism business on the network.

3.6 Marketing

3.6.1 E-commerce in marketing

Electronic commerce can be used for marketing of any industry on the internet. For example, hotel industry uses e-commerce technology to fulfil its primary and support marketing management operations by using the new technologies in the value chain. Electronic commerce helps in reduction of cost, quality improvement and faster delivery which leads to customer satisfaction, efficient buying and selling, production, and for making decisions at all levels of management. For example a website classmates.com worked on bringing together former school mates and friends. But later by 2005 social networking was used for marketing by different business organizations. Social networks operate under an autonomous business model where members are both suppliers and consumers of information and knowledge. Advertising is the only means of income but when membership and content levels are exclusive and of high order subscription based income is also possible. Many groups and forums are working as functional and subject related bodies of knowledge which help millions of subscribers. For example, Wikipedia, yahoo groups etc. Social networking sites also help patients to solve their problems. For the people with the diseases like AIDS sites like PatientLikeMe make possible the communication between the similar patients suffering from the same diseases. Shopping and classified sites like eBay, Amazon, Gateway Wal-Mart and Craiglist are the most visited sites benefited from the visits of the customers. Marketers use these sites for social networking and sale directly creating brand awareness through direct purchasing. According to the 2007 survey of online publishers Association 43% people get videos from the email messages obtained from their known people.

According to the Business Today Synovate survey 2008, more than 94% people are ware of virtual social networking and 79% are actually aware of it. “Jupiter Research Online Population Forecast 2006 to 2011: emerging Economies

Catalyze Further Growth" report forecasts that the world's online population would grow to 1.5 billion in 2006.[5]

E-commerce is found quite useful in sharing of information online and is also an enabler of supply Chain Management Activities. Nearly all the organizations are trying to use e-business technology to streamline ACM activities like joint forecasting, purchasing and collaborative planning with the use of web. Auto industries are using internet for sending e-mails and for discussion forums for knowing the details of the automaker's requirements not completely fixed in formal documentation. Retailers use attractive websites for communicating with customers and increase sales by listing the offered products easily with the use of the website. Suppliers use e-commerce technology for planning and prefer sales in bulk by making purchasing agreement. Suppliers use EDI, Fax or telephone contact the manufacturer. [11]

3.6.2 E-commerce benefits along supply chain–Product/Service Development [12]

Customer input is obtained fast resulting in faster product development. Sourcing cost is reduced along with the increased price transparency and competition. Transaction cost is reduced by double handling of information. Customer relationships and cost effectiveness are improved. Sales and distribution cost is reduced due to automation. For example sales and printed material cost. Customer service is also improved. Helps in e-tailing where an online sale of retailing is done. Use of internet by Small businesses has increased from 10 percent in 1996 to about 75%, this use will increase further up to 85% in future. Currently, only 28% companies sale goods and services online. E-tailing is a B2C activity which uses internet, create a new website to start or enhance an online business or provide hardware, software or services which allows other businesses to integrate internet into their business model. Some confidential information of the organization(bank or financial institution) like some policy strategic decisions, change in interest rates, leading norms can be send on the enterprise portal to convey it to the geographically scattered stake holders. Traditional legacy system will be time consuming, delay and inconvenience affecting the overall efficiency of the system. Enterprise portal is a single point of communication between firms

and all stake holders. Information is organized by it using visual presentations. Enterprise portal fulfils the requirements of the customers to meet unique demands placed on an organization. It is site run by the organization which creates a pool of information between stake holders and organization through the click of the mouse. Enterprise portal helps in following areas -1) improved employee productivity 2) less cost 3) sound decision making 4)faster decision making 5) increase in job satisfaction 6) improved customer service and enhanced customer relationship and loyalty 7) increased sales 8) improved collaboration with business partners 9) reduction in customer service costs. [12]

3.6.3 Summary: Electronic commerce can be used for marketing of any industry on the internet. Electronic commerce helps in reduction of cost, quality improvement and faster delivery which leads to customer satisfaction, efficient buying and selling, production, and for making decisions at all levels of management. E-commerce is found quite useful in sharing of information online and is also an enabler of supply Chain Management Activities. Nearly all the organizations are trying to use e-business technology to streamline ACM activities like joint forecasting, purchasing and collaborative planning with the use of web. Customer input is obtained fast resulting in faster product development. Sourcing cost is reduced along with the increased price transparency and competition. Transaction cost is reduced by double handling of information. Customer relationships and cost effectiveness are improved. Sales and distribution cost is reduced due to automation.

3.7 E-sourcing [13]

3.7.1 Definition of E-sourcing

It is act of buying and ordering material on the web. It provides information about what to buy from whom to buy and at what price. E-sourcing means purchasing from global suppliers. Because of fast answering rate the sourcing cost is lowered up to 10%. For example TELCO making a deal of 1500 Crore with free markets the largest sourcing deal in India. TELCO's pilot project generated savings Rs. 22 Crores last year. Pune based seven firms have set up India's first private sourcing network. Reverse auctions costing 50Crores saved Rs. 7 Crores.

3.7.2 Effect on Facility management practices [14]

E-commerce is emerged as a tool to handle the facilities. The most common use of it today is to purchase supplies and materials on the web from a specific vendor. 2 out of 10 respondents purchase a lot of material on the web. E-commerce can also be used for using facilities manuals, static project report publishing on the internet purchasing supplies and materials from internet service which connects buyers and sellers and conducting interactive courses on the internet. According to the respondents view e-commerce growth will be considerable in next two years in the area of facility management practices. Also e-commerce use will increase in every application in next two years. 25% respondents expected that e-commerce growth will be high in the area of business-to-business e-commerce which will bring a change in the facility management department. Only 2% respondents were having negative answer for the growth of e-commerce.

E-commerce can reduce the cost to the large extent of purchasing supplies and materials. Survey report clears that almost 1 out of 5 respondents purchase material on the web which indicates that e-commerce is in the early stages of adoption.

Graph 3.4: **Use of Business to business e-commerce in managing facilities.**

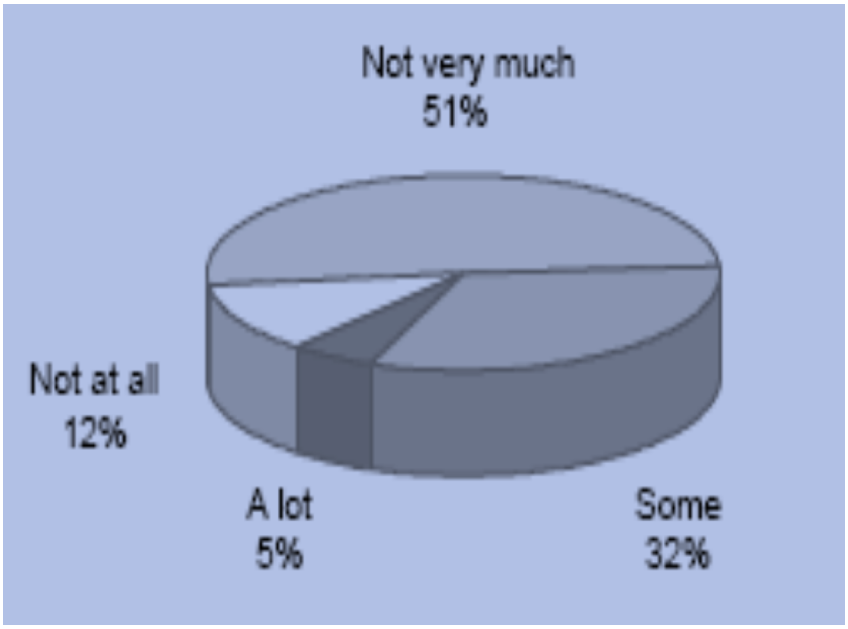


Table 3.7: Use of e-commerce in the following areas

Purchasing supplies and materials on the web from a specified vendor(N=560)	22%	23%	37%	18%
Accessing facilities materials (maintainence of training) using the internet(N-561)	23%	27%	41%	9%
Publishing static project information on the internet(N=530)	53%	18%	22%	7 %
Purchasing supplies and materials through an internet service that connects buyers and sellers (N=543)	54%	24%	17%	5 %
Taking interactive training courses via internet(N=544)	38%	28%	29%	5 %
Purchasing furniture on the internet (N = 536)	68%	17%	13%	3 %
Managing projects using commercial ,third party websites (N-540)	73%	12 %	12%	2 %
Purchasing facility services internet(N=499)	75%	16%	8%	
Purchasing energy via the internet	90%	4 %	5 %	1 %
Leasing commercial floor space via the internet	89%	9 %		

0% 20% 40% 60% 80% 100%

Use of e-commerce by industry group

E-commerce growth in next two years and the department would change "a lot."

Graph 3.5: Business to business E-commerce use in next 2 years in the facility management practices

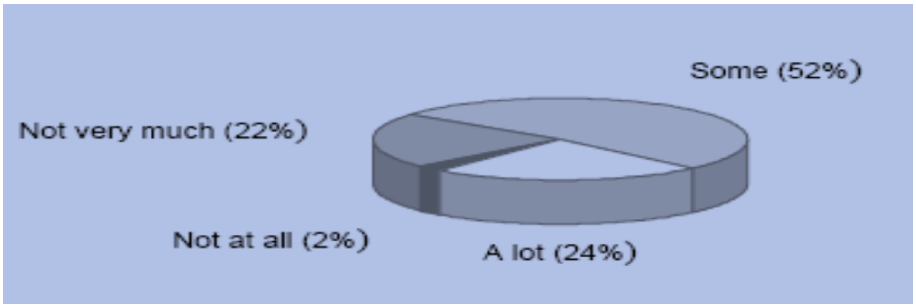


Table 3.8: E-commerce growth in next two years

Purchasing supplies and material from the specific vendor (N=553)	4%	12%	45%	40%
Accessing facilities manuals (e.g. maintenance and training) (N-544)	8%	12%	48%	27%
Taking interactive training courses via internet (N=539)	7%	18%	29%	7 %
Purchasing supplies and materials through an internet service that connects buyers and sellers (N=527)	15%	24%	42%	19%
Publishing static project information on the web (N=517)	27%	18%	36%	19%
Purchasing furniture on the internet (N = 521)	27%	24%	34%	15 %
Managing projects using commercial third party websites (N-508)	37%	24%	26%	12 %
Purchasing facility services on the web sites (N=511)	32%	28%	31%	9 %
Purchasing energy via the internet (N=452)	52%	20%	22%	7 %
Leasing commercial floor space via the internet (N=487)	58%	27%	12 %	3 %
Health and safety management(N=478)	35%	31%	28%	6 %
New construction and renovation(N=538)	41%	32%	23%	5 %
Facility Planning (N = 547)	44%	30%	22 %	4 %
Space management (N-536)	49%	27%	20 %	4 %
Real Estate management(N=483)	55%	27%	15 %	3
Energy management(N=496)	53%	25%	18 %	3 %
Leasing commercial floor space via the internet	89%	9%	1 %	1 %

Use of Business to business e-commerce in following FM functions:

E-commerce is used mostly in the areas like customer service, administrative service, and maintenance and operations. But e-commerce is also used in all the functional areas.

Table 3.9: E-commerce use in all the functional areas

Customer Service (N-512)	32%	24%	32%	12%
Administrative service (N-540)	27%	29%	35%	9%
Maintaining and operations(N=534)	30%	34%	29%	7 %
Health and safety management (N=478)	35%	31%	28%	8%
New construction and renovation (N=538)	41%	32%	23%	5 %
Facility planning (N = 547)	44%	30%	22%	4 %
Space management (N-536)	49%	27%	15%	3 %
Real estate management (N=483)	55%	25%	18%	3 %
Energy management (N=496)	53%	25%	18%	3 %

Above table gives the use of e-commerce in the nine facility management functional areas for each industry group. According to this table, e-commerce use is highest in the customer service for the electronics industry group. For telecommunications, the greatest use is for administration.

The respondent's use of e-commerce will increase in all the functional areas in next two years. Following table lists the departments which are expected to be heavy users of e-commerce and there use will double in the next two years.

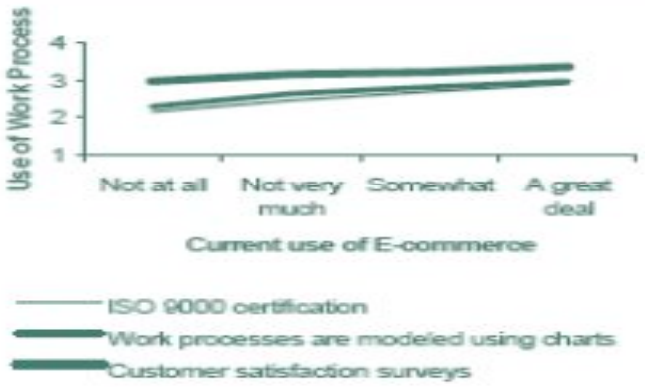
3.10 Heavy Users of E-commerce

FM Functions	Now	In 2 Yrs	%Increase
Customer service	**11.5%**	**29.3%**	**255%**
Administrative services	**8.9%**	**23.5%**	**264%**
Maintenance and operations	**6.9%**	**21,4%**	**310%**
Health and safety management	**6.1%**	**20.3%**	**333%**
New construction and renovation	**4.6%**	**14.7%**	**320%**
Facility planning	**4.4%**	**15.7%**	**357%**
Space management	**4.3%**	**14.7%**	**342%**
Real estate management	**2.9%**	**10.2%**	**352%**
Energy management	**2.8%**	**12.4%**	**443%**

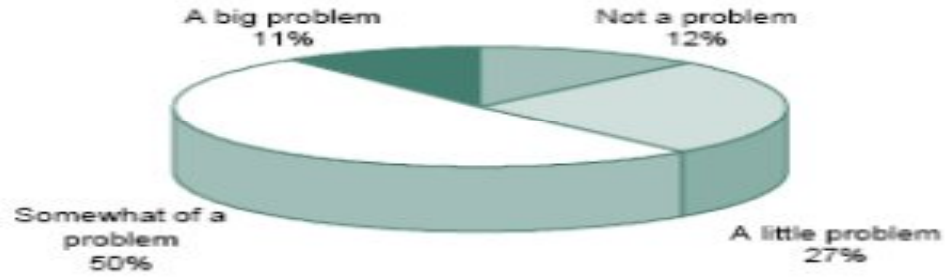
One of the objectives of this project is to identify the characteristics of departments associated with the use of e-commerce. Figure below shows the use

of three work process approaches (ISO 9000certification, work processes modeled using charts and customer satisfaction surveys) which are associated with firms that use e-commerce.

Graph 3.6: List of work processes wise current use of e-commerce



Graph 3.7 A graph showing problem of implementing B2B for facility management practices



E-commerce is not as successful as it would have been because of its ability to more effectively manage cost or time issues but this situation will change in the next two years. Usefulness of e-commerce is still questioned and respondents do not fully agree that e-commerce has decreased the cost of facility maintenance and operations(51%), or decreased the total annual cost of facilities(53%), decreased the cost of new construction projects (71%), or decreased the cost of space management (70%). But some agree or strongly agree that e-commerce has lowered the time to complete the projects (55%) and lowered the cost of purchasing supplies and materials (67%). But this situation will change within

two years where majority will be with the opinion that e-commerce saves cost and time.

3.7.3 Summary: Electronic commerce can be used for marketing of any industry on the internet. Electronic commerce helps in reduction of cost, quality improvement and faster delivery which leads to customer satisfaction, efficient buying and selling, production, and for making decisions at all levels of management. E-commerce is found quite useful in sharing of information online and is also an enabler of supply Chain Management Activities. Nearly all the organizations are trying to use e-business technology to streamline ACM activities like joint forecasting, purchasing and collaborative planning with the use of web. Customer input is obtained fast resulting in faster product development. Sourcing cost is reduced along with the increased price transparency and competition. Transaction cost is reduced by double handling of information. Customer relationships and cost effectiveness are improved. Sales and distribution cost is reduced due to automation.

3.8 Banking & Finance [15]

3.8.1 E-Commerce in Banking and Finance

E-commerce has the ability to renovate the banking and the financial systems. Banking and finance can be updated using e-commerce in three major features – 1) Banking and financial systems can market their products to the customers using the technology and business practice. 2) To serve the needs of e-commerce, e-commerce serves banks with the business opportunity to offer new products and services.3) International financial system can be formed with the new business environment and it also serves prospect for institutional modernization.

Some branches have faded due to e-brokerage and internet banking. Internet banking has three main properties -1) low cost 2) convenience 3) availability. It offers 24 hour and seven days a week service. In addition it also offers convenience and fast delivery along with customer focus and personal service. It also helps in mortgaging the property; it reduces the time required for such applications from weeks to hours. Secure online transactions are possible due to commercial use of the 128–bit encryption. This facility is offered by City

Bank, ICICI, HDFC, Global Trust, Bank HSBC, Union Bank of India, State Bank of India and Industrial Bank. City bank was the first online bank. HSBC provides full net capability to the customer in view of internet banking. The private banks like HDFC, ICICI and global trust are on its way of online banking.

E-commerce gives a business opportunity for banks and in turn offers new products and services. For micro payments, low cost feature has been created by e-commerce. Bank services can be applied in the areas of protection for e-commerce like -1) fraud electronic billing 2) It acts as an information intermediary for small businesses for the protection of online customers. It also acts as a rating agency for e-commerce. 3) It restructures the banking and financial system.

As the capital market is financing business ventures; importance of banks has lowered as an intermediate between savers and investors. This results in governments withdrawing safety support from banks and to set up an independent agency for secure payment and transaction systems. Because of this central bank may find it difficult to set interest rates by giving up their important function in financial policy.[16]

Venice was the efficient commercial centre for changing money which stopped banks to do this work. Banks were used then for depositing money and acting as protecting money of the customers. Traders started using banks and started believing them. Traders started accepting book entry transfers as payment for their products; and banks started acting as a payment intermediary between buyers and sellers. Bankers realized that the money of the depositors was lying idle which can be utilized to hold some reserves against deposits and remaining money can be invested in promising business ventures. This was the new role of banks as a financial intermediary between savers and investors and borrowers or becoming investors themselves. Banks also offered liquidity in the economy which allowed economic benefits and risks.

ATM is a electronic delivery channel used for bank financial transactions. It is self working device which does not need operators. It works 24 hours a day. Plastic currency and debit cards are used for withdrawal from this machine.

Customers account number and credit limit is read by the machine which is magnetically embedded on a strip of tape on the back side of the card. As soon as the card is inserted into the ATM machine processor reads the strip and transmits the tape data to a processor which activates the accounts and account information is displayed on the screen and the user carries out financial transactions using keyboard.

3.8.2 Electronic Fund Transfer (EFT) [15]

Electronic data interchange (EDI) is used for this electronic fund transfer. But minimum amount of data can be transferred. Three major fund transfer networks are known – 1) Clearing house interbank payment system (CHIPS) 2) Fed wire 3) Society for world wide interbank financial telecommunication (SWIFT).

These networks transfer million of dollars in each banking day and are capable of handling millions of messages per day. EDI services are widely used by banks financial institutions and insurance brokers to send messages to various partners. Electronic fund transfer facility is introduced for Indian bank customers by the Reserve Bank of India. The customer provides the details of the recipient account to other centres using this facility. Local clearing centre gets this details which processes the details and passes this details to local bank using bank network and bank credits the account of the respective recipients.

Computerization in Clearing Houses – Cheques are handled using computers in clearing houses. The work in clearing operations is huge, complex and repetitive in nature to clear exchange and settle the transactions between several banks. Computers help in speeding the process of clearing and increase the efficiency of the work Computerization has been done in many centres like Mumbai, Calcutta, Chennai, Bangalore and New Delhi of Reserve Bank of India. Clearing houses of Reserve Bank of India has utilized new technology for managing inward and outward clearing cheques. Computers are also used for scroll preparations which deal with receipts and payment transactions for government departments. A specially designed IT reader sorter system is a powerful system which is used for cheque sorting and which decreases delays in the operation.

Banking on Home Computers [15] **–** A new bank at home system has been developed to connect the customer to the bank using telecommunications networks. The interaction between the bank and the customer takes place using these lines. TV banking is possible now which was difficult few years ago.

Electronic Money Transfer (EMT) [15] **–** Here money is transferred to distant stations electronically using computerized telegraphic network. The stations are connected to the EMT networks stations. Speedy money order delivery is possible to the Indian postal department by adding more stations to the existing ones. In remote areas the department is able to give fast delivery of data text and money order with the help of EMT technology.

Union's Electronic Money Transfer (EMT) [15] **–**

Using this new electronic technology money is transferred fast in few minutes from abroad. Money can be transferred from abroad to India, from seventy five countries including United States, Canada to India. One has to just pay the required amount to be transferred along with the service charges in any western union agent office. The company's network transfers the instructions to the specified western union agent office in India in the given locality to pay the amount of money to the said recipient. Money is transferred in cash in Rupees within shorter period of time.

Financial Transactions Terminals (FTT) [15] **-** In addition to cashless shopping and cyber laundering there are other types of financial transactions Terminals (FTT) in general use. The best instance of the device used is the electronic fund transfer (EFT). Automated teller machine is one of the examples of electronic fund transfer. In banks and other financial institutions financial transactions terminals have been designed to facilitate bank transactions and online terminals are used to handle both deposits and withdrawals of the customers. [15]

E-Cheque [15]**-** With the development in the field of the information technological techniques the issue of e-cheque is greatly facilitating and has revolutionized the banking business and financial transactions. E-cheque is created on the computer and is processed through the net. In other words it is the electronic version of the paper cheque. The process of issue of and the nature of workflow in the issue of

e-cheque is the same as the conventional paper cheque. An original e-cheque was developed by the Financial Services Technology Consortium (FSTC) in the US. It is an alliance of 65 financial service providers universities government and IT companies. E-cheque is now established as the main medium of payment. It has legal support and recognition.

3.8.3 Problems of Security in E-commerce [15]

- **Authentication -** Banks use the personal identification number (PIN) and a distinct customer identity number which enables customers to access their accounts which should not be disclosed to anyone.
- **Privacy:** Internet based banking must ensure that only the right person can access all the financial information in order to ensure online privacy state of the art 1024 bit RSA SSL and RCS techniques as well as triple data encryption and standard encryption are used while connecting and communication with bank.
- **Integrity:** It involves the quality of being honest and appreciating positive work ethics and sincerity in electronic transactions.
- **Transaction Confirmation / Monitoring:** This technique involves a list of instructions to be sent to the bank before it goes online and provide a record of all the completed transactions.
- **Identification and password:** Assigning a correct password ensures the only authorization for data access.
- **Authorization:** Only the valid users will be allowed to access the data. [15] new

9. Organizational/Attitudinal Barriers *Disparate User Community*: In order to purchase materials libraries must interact with a very diverse group of partners that includes publisher's wholesaler's subscription agents and automated library system vendors. As each of these groups has different interests and objectives bringing these groups together to work toward a common goal represents a significant organizational challenge. Without the cooperative efforts of this community it is difficult to attain the support necessary to move toward EDI. Implementation ***Acquisitions*** *is sometimes less a priority than other areas of library operations.* Acquisition is often considered a 'housekeeping' function that may be less a priority than patron-oriented services such as reference and

circulation. When decisions are made to fund automation projects the acquisitions function has traditionally been given a low priority. This situation may improve has many of the other library processes are now supported by well-developed automated systems. This could help to shift the priority towards automating the acquisitions process. ***Lack of Education*** -Education is required on the part of both librarians and members of the book and serial industry. They require a basic understanding of the existing EDI standards and the benefits which can be accrued through EDI implementation. While progress has been made in this area these efforts must continue.

3.8.4 Summary: In banking and finance e-commerce helps in – 1) marketing of products 2) offers new product and services 3) International financial system can be formed 4) helps in institutional modernization. Internet banking has three main properties -1) low cost 2) convenience 3) availability. In addition it offers 24 hour and seven days a week service and also offers convenience and fast delivery along with customer focus and personal service. It also helps in mortgaging the property; it reduces the time required for such applications from weeks to hours.ATM is used for financial transactions of the bank.EDI is used for electronic fund transfer. Electronic money is transferred to different stations even abroad electronically using EMT.E-cheque established as the main medium of payment. But there are problems of security in e-commerce like authentication, privacy, integrity, authorization and organizational barriers such as lack of education, lack of support necessary to move towards EDI

3.9 E-commerce in retailing

3.9.1 E-tailing

An online sale of retail style goods is known as e-tailing. Internet use for small businesses has increased from 10 percent in 1996 to about 75% percent today. This use will still grow to 85% within few years. But currently, only 28 % of the companies sell goods online. E-tailing is a B2C activity. They can create their own website to start new business or retailing service with the use of internet. They can enhance an online business. They also can provide hardware, software

and services to other businesses to make them online. Benefits of E-retailing for the customers are as follows –

- Convenience – Customer does not need to move from shop to shop physically in order to examine goods.
- Customer gets better information at the fast speed.
- Customer gets competitive pricing due to global market.
- Customer can shop anywhere, anytime and gets better customization.
- New kind of specialization has emerged due to internet. Specialization has emerged in particular classes of customers and sellers. For e.g. lastMinute.com allows last minute purchase of e-tickets, gifts and entertainment to be matched against last minute sellers of the same item. Here we see specialization not in the product line but in class of purchases and a class of sellers.
- In addition to the specialized stores we also get generalized e-store where a store sells several product lines under a single management. Examples of this are Walmart and JC Penny.
- E-malls provide a web hosting service for individual store similar to malls. For e.g. Yahoo!Store, Geoshops and CNET store.
- E-broking is the rapidly growing area on the internet. For e.g. if a customer wants to find goods, e-broker finds the suppliers which can provide you these goods. [18]

3.9.2 Internet Portals: Organizations need to send some confidential business information like policy, strategic decisions etc. on the regular basis to different geographical areas without any problem. Enterprise portal is a solution to this problem. It is a single point of contact of community between firms and all stake holders. Information on these portals is organized using indexes and also using visual presentations. Enterprise portal is designed to meet the demands placed on an organization. This site is operated and owned by the organization to support its operation. It makes information available to the concerned staff centrally just by clicking the mouse. Uses of the enterprise portal are as follows – increase in employee's productivity 2) less support cost of employees 3) sound decision making 4) decision making cycles are faster 5) increase in job satisfaction of the employees 6) increased customer service and customer relationship and loyalty 7)

reduction in customer service costs 8) increase in sales 9) collaboration with business partners is improved.

For most retail businesses growth e-commerce is a solution. It is forecasted that e-commerce will cover $174.5B in 2007, will reach 19% from 2006 and will be holding 6% of all retail sales. Many shoppers are turning to internet and you should have a web presence in order to be successful. For many retailers to be successful they need their fully integrated retailer software integrated with the e-commerce system. Addition of retailing system on the web reduces the efforts of separately operating it and also it reduces the expenses needed. You can save a lot with the use of retail software to manage your retail stores, your warehouse, and your ecommerce site. Integrated e-commerce system has the benefits such as – 1) time and money saving 2) report generation 3) stock checking 4) total inventory management 5) customer can obtain information easily 6) in house experience.

For virtual items such as access to premium content on the website is carried out using website, but e-commerce also helps in transportation of physical items. Sometimes online retailers are known as e-tailers and online retail is known as e-tail. Most of the retailers are present online on the World Wide Web. B2B, B2C and online shopping are the type of e-commerce. Examples of B2C sites are eBay.com and Amazon.com.

3.9.3 Summary: E-tailing is a B2C activity. New website can be created for a new business. Various uses of e-tailing are convenience, better information, fast speed, competitive pricing, customer can shop anywhere, anytime etc. E-malls provide a web hosting service similar to malls. E-broking is the area on the internet which allows customers to find suppliers which can provide you these goods. For most retail businesses growth e-commerce is a solution. E-commerce retailing system can save cost and money, report generation, stock checking, total inventory management, easy information access, in house experience etc.

3.10 Education [17]

3.10.1 E-commerce in Education

With the beginning of the 21st century Internet was made a central component of learning by educators and administrators. It was expected by private corporations and educational institutions to modernize higher education and generate a source of income. In e-learning market, International Data Corp. (IDC) generated 33 percent growth of $12 billion from the year 1999 to 2004. However economic recession of the year 2000 stirred the online education industry, which resulted in shutting down of many e-learning activities.

Annually, U.S. is investing $600 billion on education to make it second largest industry after healthcare. E-education or e-learning involved one of the educations higher growing trends. According to the market retrieval service, in the year 1998 online courses were only 48 percent. In the year 2000, they got increased up to 75 %. 4000 America's colleges and universities offered online courses. E-education's promoters persist that it's unlimited worldwide use provides efficient and cost effective medium for online education. In the 20th century distance education was connected with new communication technologies. In 1921, new educational radio station was started and in 1945 first such television station was started. Year 1990, saw the growth of online education because of World Wide Web. First school created its own software for the course delivery.

The World Wide Web's dramatic expansion in the 1990s led to the growth of online education. The first schools to adopt it as a teaching vehicle generated their own software platforms for course delivery, since user-ready products weren't commercially available. By 2000, many software products appeared that allowed instructors to tailor online courses to their individual needs. These applications also featured electronic grade delivery and course assessment options.

As a part of Higher Education Act, in 2000, the DOE (U.S. Department of education) has approved Distance Education Demonstration Program. IT has connected all the sixteen Amity University campus. Any centre can be easily updated by making use of other centre. New techniques such as 'Live classroom

transmission' to carry out multiple live telecast and 'live telecast over internet' have minimized the cost of physical communication and has made possible new ways in the use of new technology. Gautam Buddha University is trying to make its website more user friendly and interactive for online admissions of various courses conducted by the university and also is using online payment option. University is also using ERP solutions for its administrative process. ERP can be used for carrying out different works like enrollment process, day to day attendance maintaining, time table and course management. It can also be used for library and laboratory management. Different modules of ERP solutions reduce the need of manual entry and register maintaining. They are also using Google Apps and video conferencing for communicating with the students. IT infrastructure has made it possible at IIM, Lucknow to automate the processes like admissions, placements and accounting systems. According to Prof. Bhaskar from IT dept, IIM Lucknow, the increase in PGP intake and training and launch of several programs, will increase support staff strength.

Apart from this a number of e-universities are being spawned around the world. They are of three types – 1) Pure cyber universities like Jones International University (http://www.jonesinternational.edu)

2) Traditional universities setting up new cyber vehicle for providing university education with other business partners. E.g. Hong Kong CyberU (www.hkcyberu.com.hk)

3) Traditional Universities offering courses themselves on the internet. Many web based technology tools are available. E.g. WebCT[18]

3.10.2 Summary: Number of e-universities have started. E-education or e-learning involved one of the educations higher growing trends. The World Wide Web's dramatic expansion in the 1990s led to the growth of online education. E-education's unlimited worldwide use provides efficient and cost effective medium for online Education University is also using ERP solutions for its administrative process. ERP can be used for carrying out different works like enrollment process, day to day attendance maintaining, time table and course management. It can also be used for library and laboratory management. Different modules of ERP

solutions reduce the need of manual entry and register maintaining. They are also using Google Apps and video conferencing for communicating with the students.

3.11 Agriculture: [19]

3.11.1 E-commerce in Agriculture

Advanced IT implementation for global agriculture integration and also for export promotions is a right choice. There exist a lot of information in different databases regarding global trade in agriculture and can be obtained using a small machine which can be of great help in agriculture. Commercial databases from United States and Europe can provide the necessary data on time sharing basis by authorized users from any part of the world.

For export promotions ***Decision support*** systems are used which are based on modeling techniques. A computerized model can be generated for finding out the target market for the products which can get maximum gross returns. The constraints such as domestic production, consumption norms, demand in target markets and trade agreements can be considered while considering the products for export.

For ***Order Processing*** also computerized system can be of great help. For example, when the enquiries are received from the foreign buyers, seller can take a decision on whether he can supply the desired products. Then the seller can search for the suppliers and can ask for the rates. If the suppliers rate are negotiable then an invoice can be generated and be mailed to the foreign buyer for order confirmations. The foreign buyer if satisfied if agrees with the rates and delivery schedules, terms and conditions, issues a purchase order and the letter of credit to the trader in India. Once the purchase order is received execution of exports is started. Order processing can be totally assisted by the computerized system. The system can generate the application papers for the bank for preshipment credit and can assist in interest calculations and can maintain a track of transactions. It also can print in different languages depending upon the target market to avoid misunderstanding. There is another area of application of IT and that is Electronic Data Interchange where data is exchanged electronically. It is a paperless communication for the documents such as purchase orders, invoices etc.

Vertically integrated EDI services have been developed by United States in the areas like large manufacturers, tiers of suppliers, stores and warehouses, dealer and retailer chains which help in smooth communication and effective information management.

3.11.2 Use for international Trade [19]

International trade logistics requires more planning and conceiving compared to domestic trade. The following are the uses of E-commerce in agriculture and trade.

- **International market research through global computerized databases.** A lot of information about the export / import trade is available in some global databases to which a tiny machine can be plugged to fetch a small but required piece of information. Large commercial databases located in the United States and Europe can be accessed for retrieving necessary data on a time sharing basis by authorized users from any corner of the world. Using this information growth rates and sales potential overseas over a period with the growth of the total imports can be compared by country and commodity. This is not possible without the use of trade intelligence. PSTN network can be used for accessing such databases.
- **Planning analyses and policy making**

  E –commerce can enhance the effectiveness of planning and policy making with the implementation of the following areas –
- Forecasting and other quantitative techniques
- Stimulation modeling and decision support systems
- Comprehensive database of trade specific information
- **Export order entry and processing**

  In this case if enquires are received from foreign buyers the potential buyers can find out whether he can supply the desired commodities. In turn the foreign buyer if satisfied with the rates, delivery schedule terms and conditions etc. can issue the purchase order. Letters to insurance companies as well as the letter of credit to the coordinating bodies can be issued.

- **Electronic data interchange**

  For effective management and communications vertically integrated EDI services are used for effective communication between suppliers, large manufacturers, stores, warehouses, dealers and retailers chains for effective information management and communication. By providing the electronic interchange of the same information the efficiency of the whole process can be increased by several folds.

3.11.3 Summary: For export promotions ***Decision support*** systems are used which are based on modeling techniques. A computerized model can be generated for finding out the target market for the products which can get maximum gross returns. The constraints such as domestic production, consumption norms, demand in target markets and trade agreements can be considered while considering the products for export. For international trade e-commerce can be used for -1) Use of EDI for effective communication business mans. 2) Export order entry and processing 3) Planning analyses and policy making 4) international market research can be done using global computerized databases.

3.12 Manufacturing

3.12.1 E-commerce use in manufacturing [20]

E-commerce helps in various processes of manufacturing and makes the process fast and easy. How e-commerce helps in different processes is described below. –

Use in Product Development

The Internet enables manufacturers to mass-customize products and offer complete solutions to satisfy customer needs. Mass-customization provides manufacturers with a major advantage over intermediaries who mainly offer standardized products.

Use in sales

The internet is a business platform requiring different processes. The valuable online information and online communication will encourage recurrent visits of the customers to the website. The website can consist of continuously updated information of the company. The website also may consist of products/services, answers to frequently asked questions (FAQs), special offers, industry and

corporate news, etc. Furthermore, online customers may be informed about inventory status, delivery options and timeframe, and payment conditions. Apart from providing information manufacturers can also collect information about the customer's requirements throughout the whole online sales process. The information can be demographic, historical, behavioral and even psychological data using cookies3 or simply asking customers for information. This information helps manufacturers to target customers, find their needs and respond quickly to the customers. In addition manufacturers can improve the accuracy of capacity requirements and return rate forecasts. E-commerce transactions can be commercial as well as financial transactions. Manufacturers can offer online and simple and risk free transactions and fulfill them quickly reliably and rewardingly.

Use in Order fulfillment and delivery

Competitive order fulfillment can be done using e-commerce very effectively. To fulfill orders cost effectively and at the right time and right place at the right time. The need of accurate and available data, fast supply chain speed and inventory planning can be achieved using e-commerce.

Use in Financial Transactions

Online financial transactions should be provided by the manufacturers in a simple, universally accepted and secure way. For e-payment customers can use their credit card or digital cash. For this customers can enter credit card number in the website. A software program at the customer's end encrypts the number, which is then transferred to the manufacturer's server and decrypted. Another way for financial transactions is to exchange traditional currency (cash, checks or employ a credit card authorization) for digital currency (called e-money or e-cash). For this method of transaction one should have a software-based electronic wallet to hold the currency and an account to be set up between the currency provider and participating merchants. For expensive products credit cards can be used while e-cash can be used for micro transactions. (e.g. a payper- advice online service).

Use in after sales service

Only good quality product is not enough for the customers but they also are needed to be provided online and offline after-sales service which may include

financing and maintenance, training users and supplying spare parts and consumables. Bulletin boards, user groups and virtual communities can also help customers to solve customer problems online, reducing the manufacturer's time and effort while strengthening the manufacturer's virtual community.

E-commerce has been proved useful for many manufacturing companies. The benefits obtained are as follows –

1) According to Kenn Fischburg, president, Consumers Interstate Corp., Norwich, CT, and CEO of ToiletPaperWorld.com, a national, wholesale distribution E-commerce has been the most successful service they have offered our customer base in 15 years. The companies E-commerce website ToiletpaperWorld.com is open to markets ranging from house holds to large corporations. Also company's transactional website SuperSupplies.com is customized to every authorized customer. A purchaser has his or her password protected home page with the product list which company has finalized for him and his or her order form. The customers are picked every month instead of for every transaction which further reduces activity for the customer and makes ordering easy for them also help is given for consolidate suppliers and reduce their activity. Customers are signing up fast.

But the cost of maintaining the website is high. Also the time spent in creating the website was high. Also eight months training time given to managers was time consuming, which took them 60% of the day. Company also had to bear additional cost of hiring ten employees.[34]old

2) Dr. Sam Bayer, Chief Executive Officer and Founder of b2b2dot0 (www.b2b2dot0.com) announced that the EFD division of Nordson Corporation (NASDAQ: NDSN) has strengthened its customer service capabilities through implementation of an SAP Integrated B2B e-commerce pilot program developed by his company. EFD is the world's leading manufacturer of precision dispensing systems for applying controlled amounts of the adhesives, sealants, lubricants, and other assembly fluids used in almost every manufacturing process. Products include air-powered benchtop dispensers, low-maintenance dispense valves for automated production lines, precision dispense tips, and dispensing robots.

Nordson CIO Shelly Peet adds: "Nordson was a pioneer in the area of SAP integrated B2B eCommerce back in 2001, and by 2008 we faced the challenge of identifying a new eCommerce solution that could transition with us as we consolidate and upgrade our SAP landscape through 2010." [21]

3.12.2 Rapid prototyping (RP) is an automated manufacturing process that quickly builds physical models from CAD files of 3D prototypes. This process develops Web-based automated RP system, which provides consumers the convenience of distance manufacturing without having an expensive RP machine. The Internet technology is used to combine product quotation interface and on-line remote monitoring system into a Web-based automated RP system. This e-business application framework of Web-based thermal extrusion RP system mainly included four parts- (1) Open .STL file using Open GL software technology, (2) product quotation system, (3) selection RP system, and (4) customers to joint an alliance. The customer can transfer .STL file via the Internet to the RP Web server. The Open GL software technology can be used to show the 3D models with different color on rotation direction. The product quotation system supplies an on-line automated cost estimation related to the option of materials, manufacturing time and RP machines before RP part being manufactured. In the RP selection system we can use some conditions (material, cost, and manufactured time) to select the RP machine. This Web-based RP selection system can help user select an appropriate RP system. After evaluating, the system shows the manufacturing time and cost. Then the RP part can be manufactured in our RP machine. During manufacturing, the customer can watch a live image of RP part via WEB, and monitor the RP machine to build up a physical part through CCD camera during the manufacturing process. If customers or companies want to joint an alliance, they can joint the companies RP selection system as a member of an association and upload their RP machine data (introduction and specification of the RP machine, and the manufactured parts) to the RP WEB server. [22]

3.12.3 Summary: E-commerce helps in various processes of manufacturing and makes the process fast and easy. E-commerce helps in different processes of manufacturing

like product development, sales, order fulfillment and delivery, financial transactions and after sales service. The companies like ToiletPaperWorld.com, b2b2dot0, EFD etc have benefited with the use of e-commerce. Rapid prototyping (RP) is an automated manufacturing process which develops web based automated RP systems. RP selection system helps user select an appropriate RP system.

3.13 Library

3.13.1 Application of EDI in the library

Libraries are not directly working as commercial business, but they work in the commercial environment. Libraries order books from various suppliers and invoicing and payment is made for these materials. Libraries also are having commercial document delivery and also deal commercially with their supporters. For example, payment of photocopies, searching for interlibrary loans which is just like other businesses and hence they process purchase orders, invoices and delivery notifications.

The main function of the library is purchasing library material, area of library functions where EDI can be applied. EDI can also be used in the works such as purchasing and interlibrary loan and document delivery.

Many organizations and groups have utilized messaging using EDI in purchasing material. The advantages associated with EDI based messaging are as follows:

- Reduction in paper use and manual work
- In time delivery and shipment of orders and books etc.
- Price information is available easily for periodicals
- Computerized and error free invoicing and payment
- Number of claims required are lowered as in case of periodicals

Even if EDI standard format is made by libraries which support EDI transactions for the purchase of books and serials, EDI systems are slower than expected. The following are the hurdles listed in the use of EDI for libraries –

3.13.2 Organizational and mind set Barriers

1. For material purchasing the library has to communicate with different groups of partners like wholesalers, publishers, subscription agents and automated library system vendors. As all these groups are having different objectives and goals, working for implementation of EDI for the library becomes difficult because of the less support by these groups.
2. Purchasing is given less priority than other functions. Purchasing is treated as a house keeping work in case of patron oriented services like reference and circulation. Especially in case of automated processes purchasing is treated with less importance. This situation can improve as many of the library services are using automated services.
3. Implementation of EDI for purchasing needs train staff in new procedures and acquire staff with system training to maintain the new system. This needs proper planning and coordination for the library management.
4. The library staff and the members of the book and serial industry should be trained. They should be given basic understanding of the EDI standards and benefits with the implementation of EDI. Since there is a progress in this area, these efforts must continue.

3.13.3 Technical Barriers

1. Libraries do not have their own team of expertise to develop software for is own operations. So they depend on the software vendors to develop the supporting software. While the software vendors are not interested in developing a software which has uncertain market.
2. EDI can not be applied easily to the library system as it is based on proprietary architectures which are difficult to covert with EDI interfaces such as translation software without taking help of system vendor. Hence library again becomes dependent on system vendors and time scales.
3. Integrated library system has a single database which takes care of all the operations of the library and users have different views of the database. It can be difficult to integrate the EDI data with existing database.

3.13.4 Interlibrary Loan/Document Delivery

According to the recent ILL and document delivery literature purpose and scope of interlibrary loan services are changing. The document delivery concept is not just delivery of returnable and non-returnable items but also can be converted into electronic form to transfer it to patrons, libraries and information brokers.

Document delivery is similar to purchasing, as an order is placed and the order is delivered. In addition demands for document delivery have increased these years because of the increase in the costs of the periodical subscriptions and lowering of the library budgets. For the delivery of individual journal articles potential market is fixed by commercial information providers, at the same time have started document delivery services to meet these demands. When the libraries use these services they become business partners with commercial suppliers.

Also other services like information and storage and retrieval, copying and communication technology are used to find the document and transfer the copy quickly. Many such services are used by serials publishers and subscription agencies which were leading in the support and implementation of the ASC X12 within the serials industry, it can be predicted that EDI will be used in future for the document delivery.

Other library functions include invoicing and payment activities which communicate with external systems. Libraries get invoices and confirm their payment if it is actually received. Library is not making the payment but the centralized finance function within the library or within the large organization such as university, college or municipal government makes the payment. These complex transactions are between invoice, purchaser and payer which are not synchronized to be integrated into EDI.

3.13.5 Using EDI in Law Library [23]

As library is non profit organizations they are likely to be more conservative in their EDI business dealings. If survival and profitability are excluded, for the implementation of EDI, it is necessary to find advantages and disadvantages of implementing EDI in law library.

Advantages of implementing EDI in law library

- Routine operations such as ordering and claiming, acknowledging and responding to orders and claims, and processing invoice information are quite time-consuming in the traditional library processing. EDI can improve the efficiency of these tasks.
- As their will be time saving due to EDI employees can spend time in handling complex problems which require more attention.
- Errors will be reduced as the information once typed need not be retyped.
- Response time is improved due to quick EDI transactions.
- Changes in the order status can be traced and confirmed easily which result in budgetary adjustments. Up to date status information can be obtained which is important for the volatile and under close and frequent inspection.
- EDI transactions are clear cut and eliminate the need of multiple messages, verbal and written explanation and clarification.
- Staff is liberated due to fast EDI transactions and is capable of giving time for providing value added services.

Disadvantages of implementing EDI in law library

- EDI requires considerable investment which includes cost of hardware software, programming and testing.
- EDI is a back room function is ignored as compared to the functions that are visible to the users.
- Publishers are not interested in implementing EDI as most of the enhancements are customer driven.
- For EDI to be successful and to obtain the maximum benefit for all the trading partners EDI cycle should be completed. Each constituent should be aware of the needs of the other constituent in developing and maintaining a successful EDI relationship. Efforts should be made in order to promote the use of EDI.

3.13.6 Summary: Implementation of EDI for library system is having organizational as well as technical barriers. For law library also there are many advantages and disadvantages in implementation of EDI like investment for hardware and software. Lack of interest for EDI implementation is the biggest problem in implementing EDI. Reduced errors, accuracy and efficiency are the main advantages of using EDI for law library. Libraries do not have their own team of

expertise hence they are dependent on software vendors for development of software.

3.14 ERP systems:

3.14.1 E-commerce for ERP systems [24]

Without the proper information Technology infrastructure, using ERP systems are not possible. It is a known fact that ERP is a combination inseparability of business and information technology. The improvement in the information technology and reduced computer prizes has made it possible for the use of ERP systems. In past, ERP systems were only used for main frame computers. Use of client server technology and Relational Database Management System has made it possible to use ERP for the personal computers and they increase the power of three tier client server technology. In client server technology, the server stores data maintaining its consistency and integrity and then from the clients desktop processes the request. The server and the client share the load of data processing and logic of the application. The three tier technology creates a middle level represents all business rules and application logic which are not the part of the application and uses appropriate validation checks. Companies which have implemented ERP have different locations of operation and control and online data transfer has to be done from these locations. To make these transactions possible for ERP systems are Electronic Data Interchange (EDI), internet, intranet, Data Warehousing, Workflow, Workgroup and Groupware etc.

ERP systems are used by many businesses and have become important in carrying out business operations and planning inside companies. Due to e-commerce development and requirements ERP vendors should continuously make changes their products. Classical ERP system characteristics are inappropriate for a future in which e-commerce is common practice. ERP systems face a number of challenges in order to remain suitable candidates for use in an e-commerce environment. Classical ERP systems are solely aimed at planning and managing a single company's internal processes.

1) Classical ERP systems only look after company-internal planning and management of business functions. A company's customers and other partners

have no direct interaction with the system. Classical ERP systems do not support front-office functions for interaction with the business environment. Also, they lack, for instance, functions for negotiating with clients and suppliers. In short, classical ERP is *incomplete*

2) Modules in classical ERP are strongly interdependent, which makes it difficult to reconfigure or extend them, or to couple them to other systems, in case of changing requirements or contexts. Hence, classical ERP is *monolithic*

3) Classical ERP systems do not support multiple companies at a time. They support a single company's planning and management, without interacting with ERP systems of customers, suppliers, and other partners. However this is not true in case of many ERP systems which also support supply-chain management functions, and most of them enable EDI messaging.

4) Fourth, classical ERP systems are focused on the planning of individual companies, rather than on cross-company planning or sharing ERP functions. Of course, in some cases, cross-company functions may reside at a single company, typically a powerful company in a chain or network. Still, whether distributed or centralized, ERP functions are support single company's basis. In short, classical ERP is *single-company*

5) Fifth and finally, classical ERP systems impose rigid structures onto data and processes. A considerable degree of configurability is offered, but in many cases the business process has to be tuned to the system to some extent. Once in use, changes in environment or requirements, and does not support flexibility, non freer forms of interaction. In short, classical ERP is *restrictive*

These problems can be overcome by making the following changes in the business processes for the use of e-commerce as follows. -

From incomplete to extended ERP- As E-commerce helps in business interactions with business partners.ERP functions should be extended to the border functions of the company which may include functions such as front-office functions, such as electronic shops, electronic catalogues, client-initiated order tracking, electronic payment, and customer-relationship management. These types of functions are called as extended ERP or XRP. At the back end of the company

functions such as electronic procurement and supply-chain management functions may be added. ERP vendors have started providing sell side e-commerce modules. Companies like ERP, Netscape, Broadvision already provide these functions. To take the full benefit of XRP they should be combined with original internal ERP system. At the same time client initiated order tracking should not be done with human involvement. Combining of e-commerce applications with ERP is carried out manually by re entering data by hand and coupling is done electronically this will be implemented by means of hand written patches. But if e-commerce and ERP modules are from the same vendor this problem will not arise. They will perfectly fitting each other. The inclusion of negotiating functions in extended ERP will help ERP systems to do business with electronic commercial brokers or negotiating agents.

From monolithic to component-based ERP

It systems should be flexible enough to companies changing business environment and customers. This flexibility is not possible with classical ERP. Therefore ERP vendors are reengineering their product into series of subsystems and components. Bann is the company who has already started this type of work. These components are then supplied on a component by component basis and assembled and configured to fulfill the needs of the specific users. For the components to be interoperable they should follow component-based architecture. These components run on a component framework like DCOM, CORBA, or Enterprise Java Beans.

Non-coupled to coupled ERP-To change ERP from non-coupled to coupled ERP should be extended with e-commerce functions. XRP functions should be combined company border functions. Traditionally this is done by EDI messaging Technology. But this technology is very costly and time consuming for standardization and implementation. Also EDI only provides data coupling and not process coupling.

Single-company to multi-company ERP-Classical ERP systems work for business processes of individual companies. In network economy companies not only conduct e-commerce on electronic basis but they also co-operate in design,

planning and other activities in order to effectively or efficiently conduct business. For e.g. tracking and tracing products will be done in collaboration with network of companies. Similarly logistics planning, forecasting, and replenishment can be done in co-operation,

Restrictive to flexible ERP

Rigidity of ERP systems can be overcome using e-commerce. Similarities between business processes and their adhering to the reference models can be checked. While some find the differences between the companies and undertake a custom made approach. In any case the systems should be configurable to fulfill its specific requirements. In past the companies had long term relationship due to rigidity of data formats used but now a days companies are having short duration ties sometimes even for the duration of a single order. ERP systems should be able to follow this volatility by means of flexible, preferably on-the-fly reconfiguration.

Multimedia

In e-commerce, multimedia data is also needed along with text or record oriented data. This type of graphical product information is provided to end customers.

CSCW

For communication and co-operation, ERP and many e-commerce applications with ICT applications are combined to form CSCW (Computer-Supported Co-operative Work) applications.

ERP as a product or as a service

When ERP is offered on a component basis, ERP components may even be outsourced one by one, or ERP modules from different vendors may be used. It is also possible to have one (typically large or powerful) member of the chain or network to provide these services.

3.14.2 Summary

ERP systems face a number of challenges in order to remain suitable candidates for use in an e-commerce environment. Classical ERP system characteristics are inappropriate for a future in which e-commerce is common practice. ERP systems

face a number of challenges in order to remain suitable candidates for use in an e-commerce environment.

Classical ERP systems are monolithic, incomplete, support single company management, impose rigid support on data and processes (restrictive) use of extended ERP or XRP. ERP when used with e-commerce is changed into series of subsystems and components. To change ERP from non-coupled to coupled ERP should be extended with e-commerce functions. It also changes from restrictive to flexible ERP and also changes from single company to multi-company ERP.

3.15 Airline Business

3.15.1 E-commerce in Airline Business [25]

Airlines adopted e-commerce first for the sale of air tickets but now all airline product sales is made online. Airline industry is the highest benefited industry for online sales than any other industry. Still, internet is sometimes beneficial and sometimes reduces income. To obtain the benefits of the internet and avoid its damages airlines should use tools such as computerized revenue management system and e-distribution system. E-commerce brings lot of benefits it has many risks which need to be considered and controlled so that they need not turn destructive or to obtain the advantages of high technology.

Airlines are the most successful business without the involvement of a government because of the nature and cost structure of the business. There are two types of costs in the airline business viz. direct and indirect operating costs. Direct operating cost includes aircraft, fuel, and salaries make about 60% of the total cost and indirect operating cost includes distribution costs which is 40% of the total cost. Direct operating costs are fixed and they can not be changed. Due to this many airlines reduce the indirect cost which is distribution cost which includes 1) Reservation system cost 2) Ticketing fees 3) Sales offices (stations) cost 4) Advertising and sales promotion cost 5) Agent fees and commissions. 3 to 25% of the commissions are paid to the travel agents to sale tickets by the airlines. Airlines also spent a lot of money and resources on selling of their tickets by themselves. In order to decrease the distribution costs, e-commerce should be used and will have to reduce number of distribution channels and will have to

reduce Computer Reservation Systems (CRS) and sales agents. Big airlines have already started this practice. They have set up online sales network and every website has online booking facility. Some of the websites are having B2B and B2C and travel related services. Online bookings are also possible due to travel websites like Priceline and internet booking engines such as Expedia.

The following chart gives internet booking figures of the US airline industry in the past five years and the estimated costs of the coming two years.

Table 3.11 internet booking figures of US airline industry (Year1996 to 2000)

	Total # of on-line air tickets buyers	Total # of on-line travel market revenue	% of total US airline bookings
1996	25.3 m	US$276 m	1.3%
1997	32.2 m	US$827 m	2.9%
1998	41.0 m	US$1.9 b	4.3%
1999	48.1 m	US$ 3.2 b	5.9%
2000	54.2 m	US$ 4.7 b	7.4%
2001 (estimated)	60.5 m	US$ 6.5 b	9.2%
2002 (estimated)	71.9 m	US$ 8.9 b	11.1%

For purchasing airline ticket on the internet we need -1) a computer 2) fast internet access 3) a credit card 4) e-tickets for some of the airlines

Because of the nature of airline business e-commerce bookings are increasing even if all the regular travelers from USA are having necessary means to do online bookings. Air line ticket is sold at different prices depending upon when and where it is sold whether it has been sold late or earlier. Also number of factors is considered such as duration of stay for the person staying Saturday night. Discount is given for regular travelers and for the tickets purchased before fourteen days. Discount is also given for the group purchase of the tickets. Also many airlines are sharing inventory over certain routes to avoid competition. Price also depends on the place where it is sold. Travel agents also offer some discount on prices. Due to the lack of technology changing demands of the customers are not sorted fast which results in less revenue. Airline inventory is time sensitive and with limited quantity. Air tickets sold early generate less revenue and if sold

at high price people will not buy it. If it is not decided when, where and under what conditions to sell the tickets, airline cannot price the tickets online correctly.

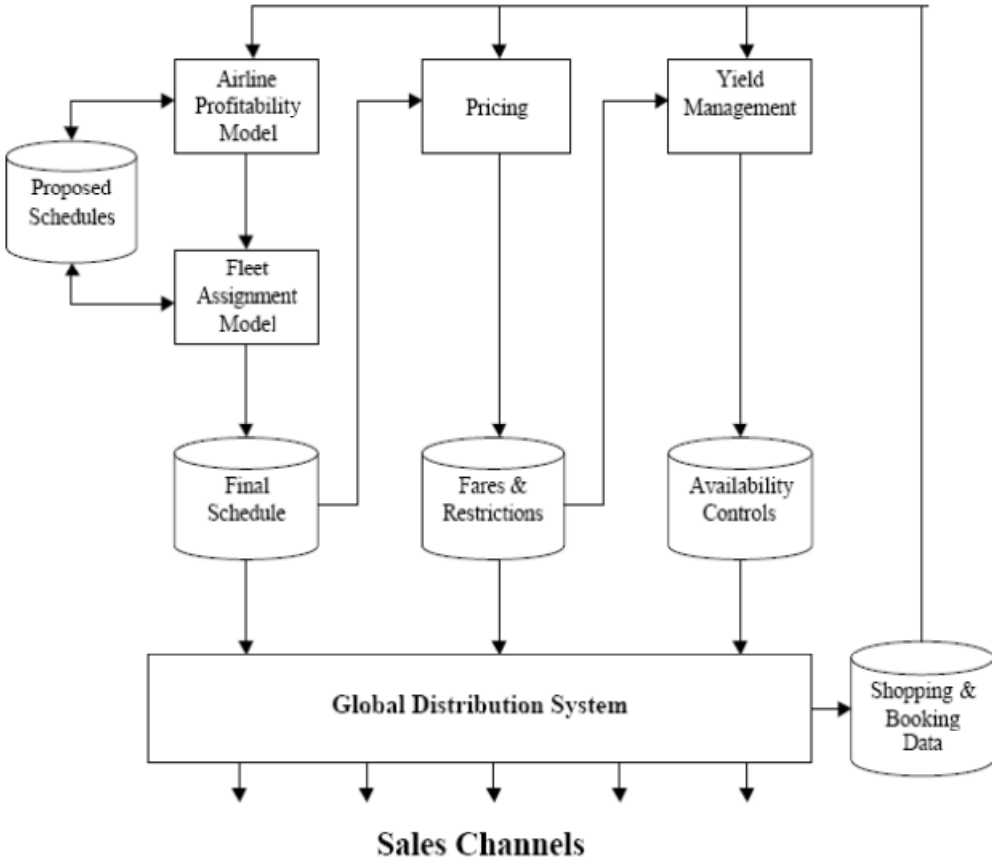
To obtain the benefits of e-commerce and to avoid less income, airlines are using new tools such as revenue management systems and Internet distribution systems. Revenue management is also known as revenue optimization or yield management which uses computerized system for analyzing historical booking trends and current booking to find out demand of the passenger traffic for each market segment. It means it calculates the passenger prize levels. Depending upon the prediction and given fares of the booking class, it can be found out the number of seats to be allocated in each booking class in order to maximize the revenue. Such revenue management systems are used by many airlines and an automatic distribution mechanism is used to transmit the recommendations of the revenue management online. Such a mechanism fixes all the scheduled flights, journeys, prices and number of seats which are displayed on the web. It also monitors market competitive activities. Only under these circumstances the prizes of all seats can be found out for each response to the request. In this way only airlines can minimize revenue dilution and can save distribution costs with increase in the custom satisfaction.

E-commerce is capable of changing consumer behavior or customer culture and can bring commercial revolution. But e-commerce is more beneficial to consumers and is less beneficial to the airline industry, which makes airline industry reluctant to take their business online. But it can be predicted that any industry will have its own problems and internet use will depend upon the associated risks. Hence it is quite clear that fast e-commerce growth is not possible in this internet age. E-commerce will grow only 8% of GDP by 2003 in USA, the largest E-commerce country in the world.

Decision making increases with the use of e-commerce and if some body makes the mistakes then the damage will be very high. At the same time it is not known what impact on the organizations and business patterns. It will have after the implementation of the e-commerce airline will have to change organizational structure and business procedures. These changes will be difficult. Airline

industry in U.S.A had taken up certain adventures which show that to get the benefits of e-commerce careful planning and huge investment is needed. Not only the infrastructure but also the tools such as computerized revenue management system and distribution system are need for avoiding income losses. One should know the risks on any high technology and should know what needs to be done. One should not be hasty and should be careful while implementing new technology like commercial use of internet. The government moving online will be an added advantage for the businesses.

Figure 3.2: Airline Profitability Model

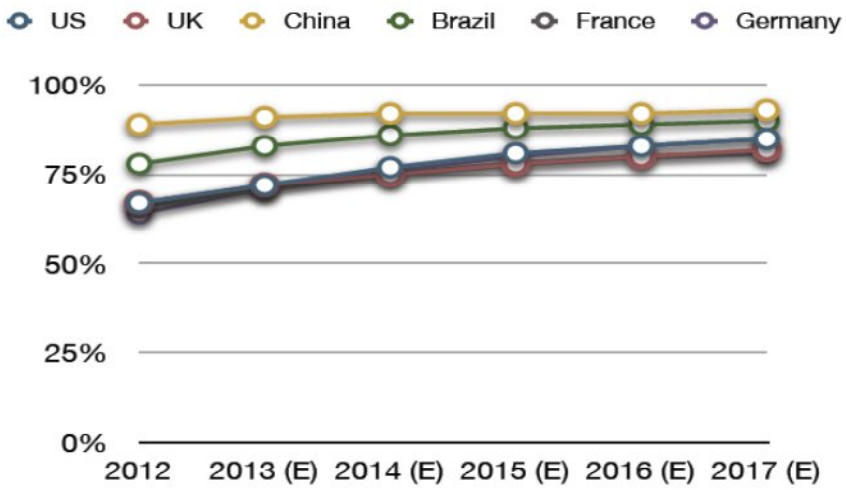


Data collected and stored using the e-commerce infrastructure drive the airline scheduling and yield management. Airlines use the sales and the marketing data to build the optimal schedules. They also use the data to set optimal prices and yield management controls.

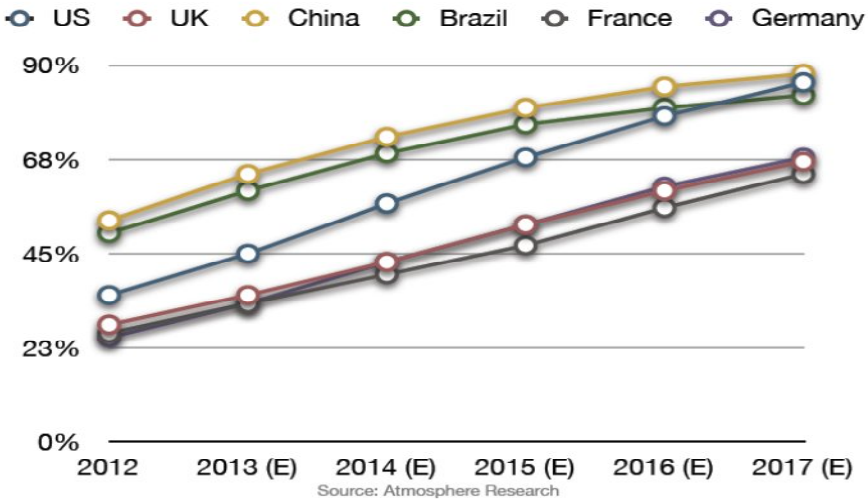
3.15.2 Future of Airline Business [26]

In spite of the risks in use of e-commerce it is observed that e-commerce use would increase in future in airline business. Google analysis shows that any traveller uses 22 websites to research a trip in multiple shopping sessions before booking. There are more than 200 million tweets per day on Twitter. Apple Company sold 2 million iphone, 5 smart phones in the first 24 hours. Nine in ten UK online free time airline passengers have high speed internet access in their homes. Similarly 94% online free time passengers in France, Germany and china as well as 95% Brazilian and 98% US free time passengers are having high speed internet access in their homes. Passengers spend a lot of time for travel planning, booking and servicing and expect more facilities from airlines. By 2017 it is expected that 50% of the online direct bookings will be done with the use of mobile. World wide e-commerce sales will reach US$1.4 trillion in 2013 with double digit CAGR. The following graphs show the growth in future of the use of smart phone and tablet PCs which are needed to do bookings online.

Graph 3.8: Near universal smart phone adoption of passengers 2012-17



3.9 Anticipate sharp growth in passengers Tablet Device Adoption By 2017



According to The chief marketing officer of an Asia/Pacific based network/ flag airline, airlines websites will produce 59% booking volume by 2017 up from 35% in 2012.

3.15.3 Summary:

All airline product sales are made online. Airline industry is the highest benefited industry for online sales than any other industry. Still, internet is sometimes beneficial and sometimes reduces income. To obtain the benefits of the internet and avoid its damages airlines should use tools such as computerized revenue management system and e-distribution system. E-commerce brings lot of benefits it has many risks which need to be considered and controlled so that they need not turn destructive or to obtain the advantages of high technology. To obtain the benefits of e-commerce and to avoid less income, airlines are using new tools such as revenue management systems and Internet distribution systems. To obtain the benefits of e-commerce and to avoid less income, airlines are using new tools such as revenue management systems and Internet distribution systems. In spite the risks in using e-commerce for airline reservation system the use of e-commerce is growing. Airlines websites will produce 59% booking volume by 2017 up from 35% in 2012.

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CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

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DATA ANALYSIS
AND
INTERPRETATION

4.1 Introduction

The data collected from the survey of the companies through questionnaire and interviews of the company employees is compiled in 15 tables of pharmaceutical company's data. Statistical parameters and graphics have been used wherever necessary and required. In order to achieve the given objectives researcher has classified analysis in the following broad headings -

1) Computerization in the organization – departmental / organizational
2) Type of software used in the organization – a) commercial b) desktop c) standard pharmaceutical d) ERP e) home made & f) e-commerce
3) E-commerce use for the different purposes such as –a) marketing and sales b) manufacturing c) advertising d) human resource e) research f) any other than this
4) E-commerce is benefited for – a) The employees b) management c) suppliers d) distributors e) government agencies f) manufacturers
5) Applications of e–commerce in the following areas of pharmaceutical industry – a) expanded geographical use b) expanded customer base c) providing customer valuable business information d) available 24/7/365 never close e) provide customer valuable info f) build customer loyalty g) reduction of marketing and advertising cost h) collection of customer data.
6) Whether e-commerce is used in process of implementation and in the process of manufacturing and sales.
7) Factors influencing e-commerce development in the pharmaceutical industry such as -a) telecomm infrastructure and government regulations b) related and supporting industries c) Firm strategy structure 40 demand conditions.
8) Which processes are involved in e-commerce of the pharmaceutical industry (B2C / B2B / C2B / C2C / B2G)

   Which technology is more suitable for e-commerce in pharmaceutical industry?

9) Does e-commerce saves cost with the help of factors such as storage space, paperless office, clarity, accuracy, speed up process, transferable etc.

10) Issues in e-commerce faced by the pharmaceutical industry like a) technological barrier b) infrastructure c) company literacy d) resistance for changing to new technology e) security problems f) man power etc.

11) Payment system used in the pharmaceutical industry (credit card / digital cash / online stored value system / B2B payment system.

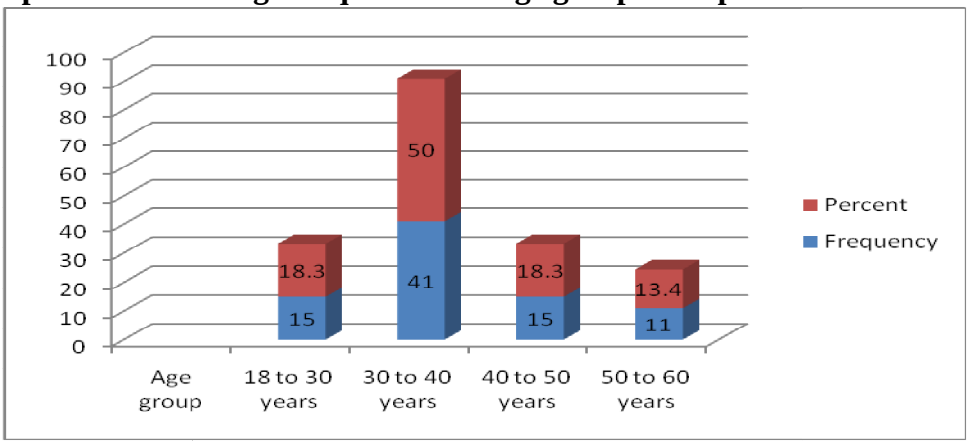
4.2 Age group of the users using e-commerce

Table 4.1 gives the frequency distribution of users and their percentage according to their age groups. From the table it is seen that users in the age group 18 to 30 years are less in number only 18.3 percent as there are less number of employees in this age group. Users in the age group 30 to 40 are 50 percent and this is the highest percentage. Users from the age group 40 to 50 are having same percent (18.3). Users from age group 50-60 are the experienced people and they are less in number equal to 13.4 percent.

4.1 User age group

Age group	Frequency	Percent
18 to 30 years	15	18.3
30 to 40 years	41	50.0
40 to 50 years	15	18.3
50 to 60 years	11	13.4
Total	82	100.0

Graph 4.1: Percentage/frequencies of Age group of respondents



4.3 Computerization in the organization

Table 4.2 gives the distribution of computerization in the organization at two levels – 1) departmental 2) organizational. It is seen that computerization at the department level is more than organizational level and its percent is 68.3 and at the organization level it is 31.7 percent. The frequency at the department level is also high (56) comparative to the organizational level which is 26. From the table it is clear that the use of computers is more at department level is more comparative to organizational level due to the fact that office work can be done using computers at the department level.

Table 4.2 :computerization in the organization

Count/ percentage	computerization in the organization		Total
	Organizational level	Department level	
Count	26	56	82
Percentage of Total	31.7%	68.3%	100.0%
Count	26	56	82
Percentage of Total	31.7%	68.3%	100.0%

Table 4.3 gives the use of computers at the different levels like –organization 2) Department level. The distribution shows that computerization is high at department level i.e. 68.3% while computerization is less with 31.7%.

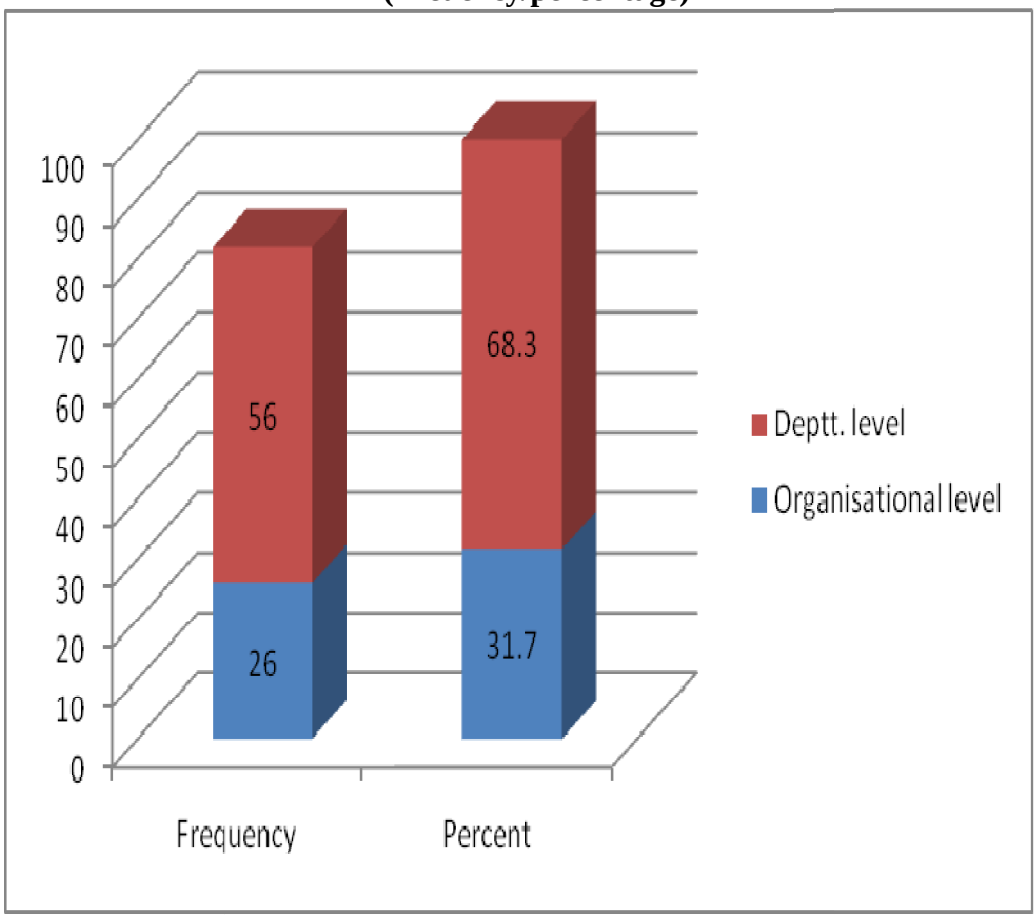
Table 4.3: computerization in the organization
(Percentage / cumulative percentage)

Level	Frequency	Percent	Valid Percent	Cumulative Percent
Organizational level	26	31.7	31.7	31.7
Department level	56	68.3	68.3	100.0
Total	82	100.0	100.0	

4.4 computerization in the organization-Organization or deptt

Level	Frequency	Percent
Organizational level	26	31.7
Department level	56	68.3
Total	82	100.0

Graph 4.2: Computerization in the organization or department (Freuency/percentage)



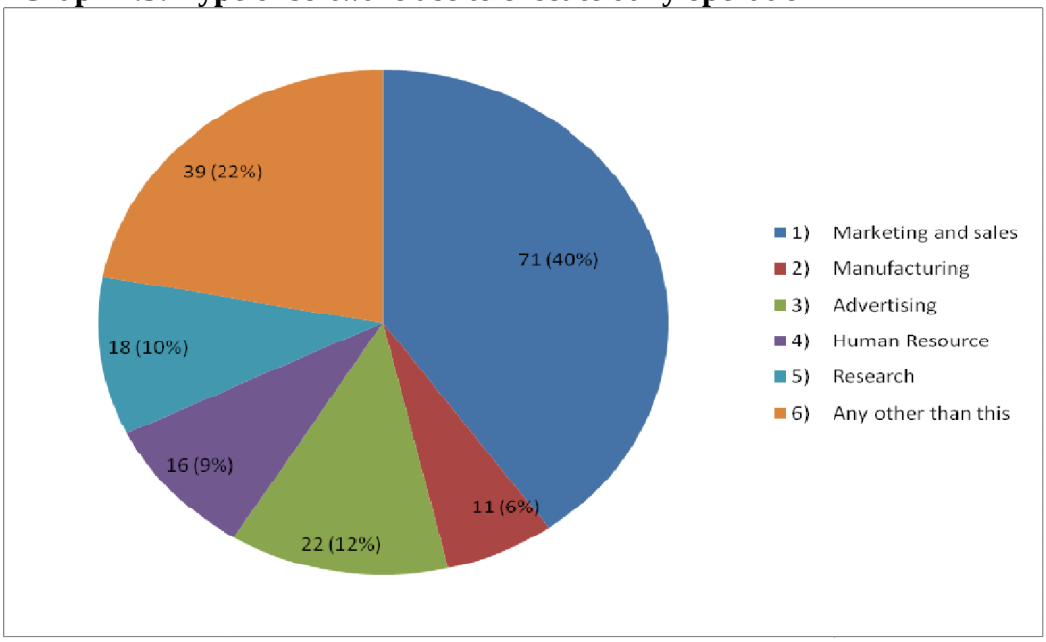
4.4 Distribution of software used in the organization

Table 4.4 gives distribution of software used in the organization. It is seen that ERP software is used mostly in the organizations and its percentage is 37.8%. ERP software is beneficial software for all their transactions. Next to that is commercial software. Its use is 20.7%.

4.5 Type of software use to execute daily operation

Type of software	Frequency	Percent
Commercial	17	20.7
Desktop	11	13.4
Standard pharmaceutical	11	13.4
ERP	31	37.8
Home made	11	13.4
E-commerce	1	1.2
Total	82	100.0

Graph 4.3: Type of software use to execute daily operation



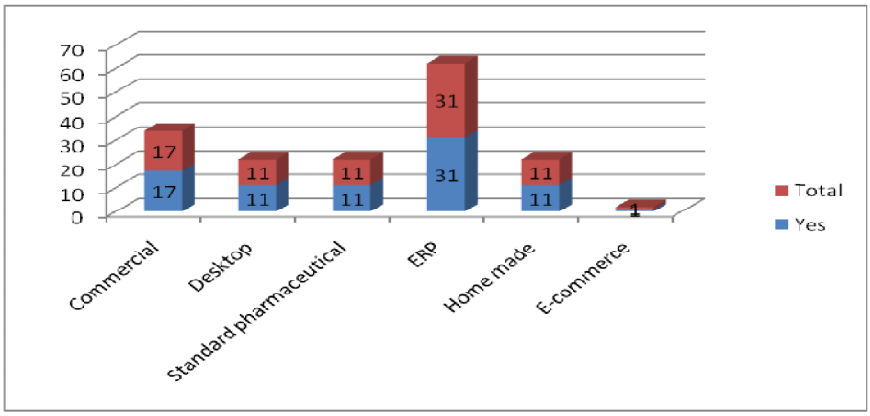
Commercial software helps in sales and purchase operations of the organization. Desktop software is the basic need of an office and its use is 13.4%. Some companies use standard pharmaceutical software and its use is also 13.4%. Some companies use home made software i.e. software developed in house with the programmers team as required by the company and its percentage is 13.4%. Some companies use e-commerce software but its use is very less at 1.2%.

4.5 Type of software use to execute your daily operation

4.5.1 Cross Tabulation of type of software Use and use of e-commerce

The following table gives the cross tabulation values of type of software used to execute daily operation and use of e-commerce. It is seen from the table that all the software are used totally for the use of e-commerce and not for any other purpose

Graph 4.4: Type of software use for the use of e-commerce and total



4.6 Type of software use for the use of e-commerce and total

Software	use e-commerce	Total
Commercial	17	17
Desktop	11	11
Standard pharmaceutical	11	11
ERP	31	31
Home made	11	11
E-commerce	1	01
Total	82	82

As seen by the table total usage of the commercial software is 17 and it is used for e-commerce purpose. Similarly desktop, standard pharmaceutical and home made software usage is 11. Similarly total usage of the e-commerce software is 1 out of 82 and it is used for the use of e-commerce. ERP software usage 31 out of 82, and it is used for e-commerce purpose.

4.5.2 Type of Software use to execute daily operation of Marketing, Sales

Table 4.5.2 gives the uses of different software and for marketing and sales. The

table shows that 17 companies out of 82 use commercial software and 11 companies out of 17 companies use it for marketing and sales while 6 companies are not using it for marketing and sales.

Desktop software is used by 11 companies out of total 82 e-commerce using companies and 8 out of total 11 companies using desktop use it for marketing and sales. 3 companies are not using desktop software for marketing and sales.

Standard pharmaceutical software is used by 11 companies out of total 82 e-commerce using companies and 9 out of total 11 companies using Standard pharmaceutical use it for marketing and sales. 2 companies are not using Standard pharmaceutical software for advertising.

ERP software is used by 31 companies out of total 82 e-commerce using companies and 25 out of total 31 companies using ERP use it for marketing and sales. 6 companies are not using ERP software for marketing and sales.

Home made software is used by 11 companies out of total 82 e-commerce using companies and 8 out of total 11 companies using home made software use it for marketing and sales. 3 companies are not using home made software for marketing and sales.

E-commerce software is used by only 1 company out of total 82 and it is used for marketing and sales. The table also shows that out of total 82 companies 62 companies use it for marketing and sales remaining 20 companies are not using it for marketing and sales.

Graph 4.5: Type of Software use for marketing and sales

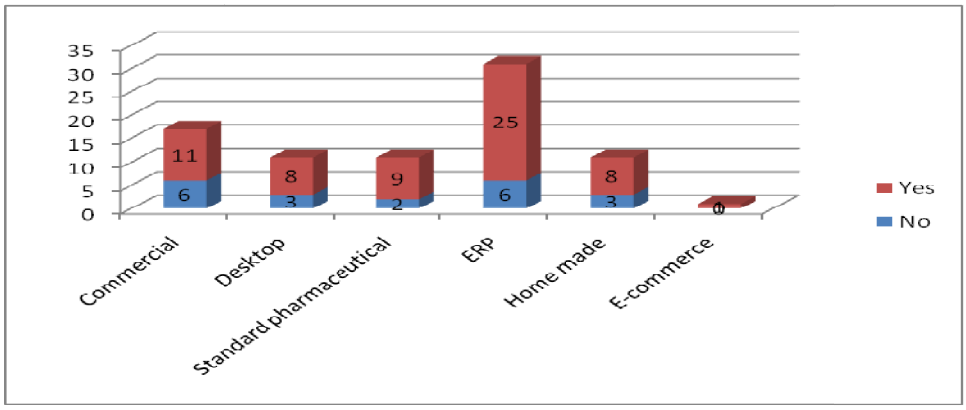


Table 4.7: Type of Software use for marketing and sales

Type of Software use to execute daily operation	Marketing and sales		
	No	Yes	Total
Commercial	6	11	17
Desktop	3	8	11
Standard pharmaceutical	2	9	11
ERP	6	25	31
Home made	3	8	11
E-commerce	0	1	1
Total	20	62	82

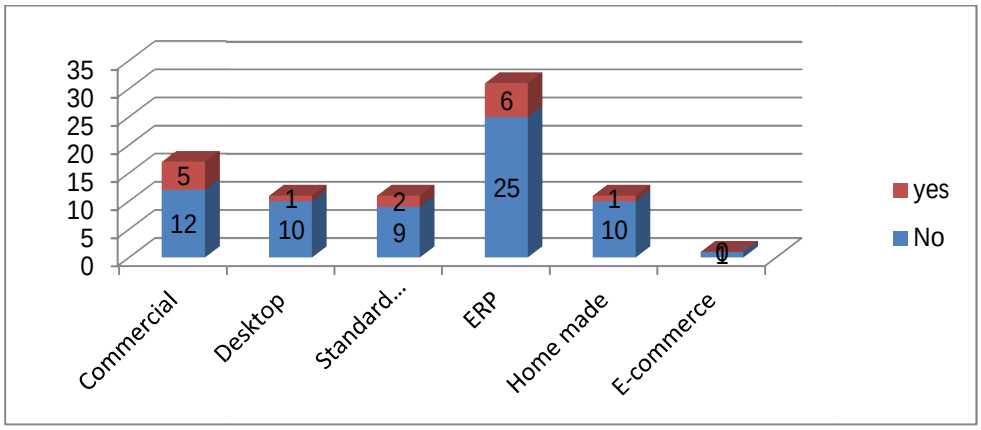
4.5.3 Type of Software use for manufacturing

Table 4.5.3 gives the distribution of type of software use for manufacturing. It is seen that commercial software is used in 5 companies and it is not used in 12 companies out of the total 17 companies using commercial software. Desktop software use is very less only in one company and total 10 companies out of total 11 companies are not using e-commerce software. Standard pharmaceutical software is used only in 11 companies out of 82 companies out of which 9 companies are not using it for manufacturing and 2 of them are using it for the purpose of manufacturing. ERP software is used in total 31 companies out of 82 companies using e-commerce out of which 25 are not using it and only 6 of them are using it for manufacturing. Home made software is used in 11 companies out of which only in one company it is used for manufacturing and in 10 companies it is not used for manufacturing. E-commerce software is used only in one company out of total 82 e-commerce using companies and it is not used for manufacturing. The table also shows that only 15 companies out of 82 use different software for manufacturing i.e. for manufacturing use of e-commerce software is very less. 67 companies out of total 82 e-commerce using companies are not using e-commerce.

4.8 Type of Software use for manufacturing Cross tabulation

Type of Software use to execute your daily operation	yes -purpose		Total
	0	Manufacturing	
Commercial	12	5	17
Desktop	10	1	11
Standard pharmaceutical	9	2	11
ERP	25	6	31
Home made	10	1	11
E-commerce	1	0	1
Total	67	15	82

Graph 4.6: Type of software use for manufacturing



4.5.4 Type of Software use for advertising

Table 4.5.4 gives distribution of different software for advertising purpose. The table shows that 17 companies out of 82 use commercial software but only 4 companies out of 17 companies use it for advertising while thirteen companies are not using it for advertising.

Desktop software is used by 11 companies out of total 82 e-commerce using companies but only 2 out of total 11 companies using desktop use it for advertising. 9 companies are not using desktop software for advertising.

Standard pharmaceutical software is used by 11 companies out of total 82 e-commerce using companies but only 1 out of total 11 companies

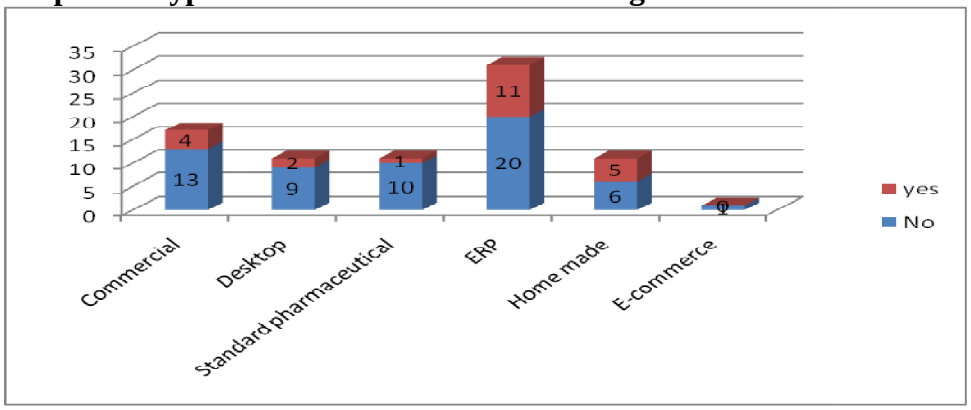
using Standard pharmaceutical use it for advertising. 10 companies are not using Standard pharmaceutical software for advertising.

ERP software is used by 31 companies out of total 82 e-commerce using companies but only 11 out of total 31 companies using ERP use it for advertising. 20 companies are not using ERP software for advertising.

Home made software is used by 11 companies out of total 82 e-commerce using companies and 5 out of total 11 companies using home made software use it for advertising. 6 companies are not using home made software for advertising.

E-commerce software is used by only 1 company out of total 82 but they are not using it for advertising. The table also shows that out of total 82 companies 23 companies use it for advertising remaining 59 companies are not using it for advertising.

Graph 4.7:Type of Software use for advertising



4.9 Type of software use for advertising

Type of Software use to execute your daily operation	Advertising		Total
	No	Yes	
Commercial	13	4	17
Desktop	9	2	11
Standard pharmaceutical	10	1	11
ERP	20	11	31
Home made	6	5	11
E-commerce	1	0	1
Total	59	23	82

4.5.5 Type of Software use for Human Resource

Table 4.5.5 gives use of different software for human resource. Out of total 82 companies 17 companies are using it for commercial purpose but out of it only 3 companies are using it for human resource and 14 companies are not using it for human resource.

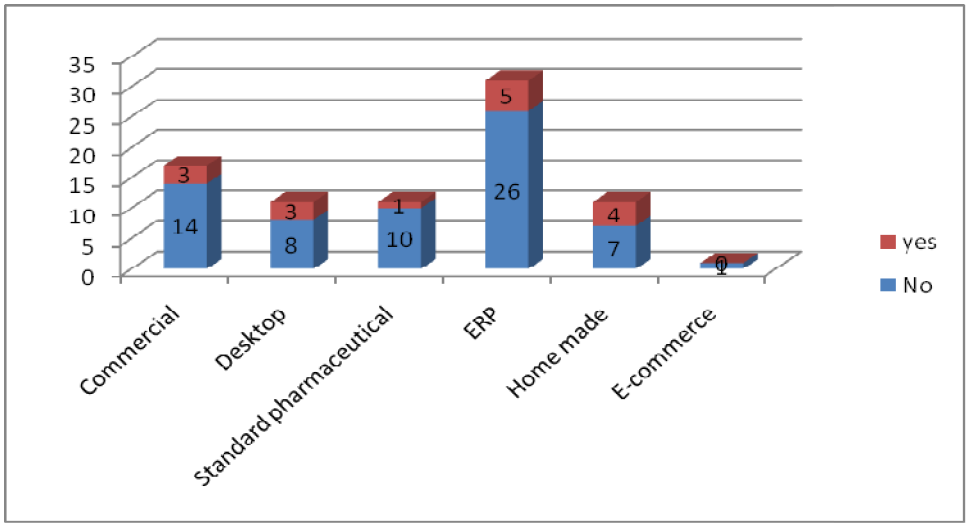
Desktop software is used by 11 companies out of 82 but only 3 of them use it for human resource 8 companies out of 11 are not using it for human resource.

Standard pharmaceutical software is used by 11 companies out of 82 but only 1 of them use it for human resource 10 companies out of 11 are not using it for human resource.

Home made software is used by 11 companies out of 82 but only 4 of them use it for human resource 7 companies out of 11 are not using it for human resource.

E-commerce software is used by 1 company out of 82 but it is not using it for human resource. The table also shows that 16 companies use different software for human resource and 66 companies are not using it for human resource.

4.8 Type of Software use for Human Resource



4.10 Type of Software use for Human Resource

Type of Software use to execute your daily operation	Human Resource		Total
	No	Yes	
Commercial	14	3	17
Desktop	8	3	11
Standard pharmaceutical	10	1	11
ERP	26	5	31
Home made	7	4	11
E-commerce	1	0	1
Total	66	16	82

4.5.6 Type of Software use for research

Table 4.11 gives the use of different software for research. The table shows that 17 companies out of 82 use ***commercial*** software but only 4 companies out of 17 companies use it for research while thirteen companies are not using it for research.

Desktop software is used by 11 companies out of total 82 e-commerce using companies but only 1 out of total 11 companies using ***desktop*** use it for research. 10 companies are not using ***desktop*** software for research.

Standard pharmaceutical software is used by 11 companies out of total 82 e-commerce using companies but only 3 out of total 11 companies using ***Standard pharmaceutical*** use it for research. 8 companies are not using ***Standard pharmaceutical*** software for research.

ERP software is used by 31 companies out of total 82 e-commerce using companies but only 6 out of total 31 companies using ***ERP*** use it for research. 25 companies are not using ***ERP*** software for research.

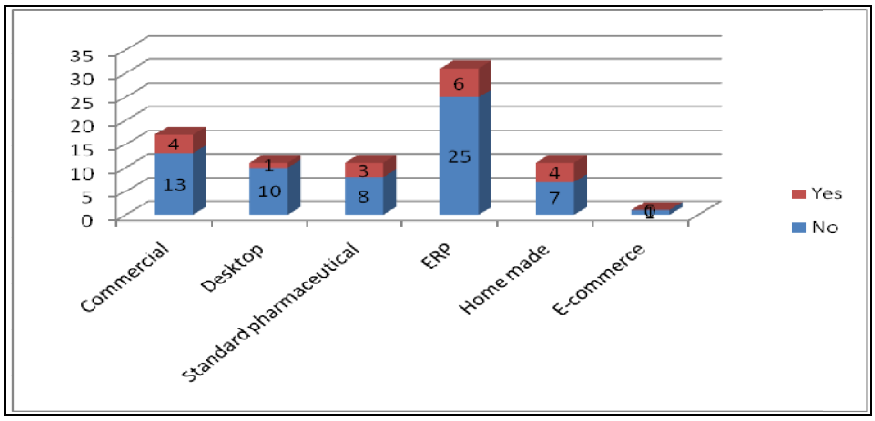
Home made software is used by 11 companies out of total 82 e-commerce using companies and 4 out of total 11 companies using ***home made*** software use it for research. 7 companies are not using ***home made*** software for research.

E-commerce software is used by only 1 company out of total 82 but they are not using it for research. The table also shows that out of total 82 companies 18 companies use it for research remaining 64 companies are not using it for research.

4.11 Type of software use for research

Type of Software use to execute your daily operation	Research		Total
	No	Yes	
Commercial	13	4	17
Desktop	10	1	11
Standard pharmaceutical	8	3	11
ERP	25	6	31
Home made	7	4	11
E-commerce	1	0	1
Total	64	18	82

Graph 4.9 : Type of software use for Research



4.5.7 Companies using different Software for Marketing and sales

The following table gives the count and the percentages of the companies using different software for marketing and sales and also it's cross tabulation with companies not using it for marketing and sales. It is seen from the table that there are 11 companies using ***commercial*** software for marketing and sales and 6 companies not using ***commercial*** software for marketing and sales. The percentage of companies not using ***commercial*** software with the total companies not using ***commercial*** software is 30.00%. The percentage of

companies using ***commercial*** software with the total companies using ***commercial*** software is 17.7%.

It is seen from the table that there are 8 companies using ***desktop*** software for marketing and sales and 3 companies not using ***desktop*** software for marketing and sales. The percentage of companies not using ***desktop*** software with the total companies not using ***desktop*** software is 15.00%. The percentage of companies using ***desktop*** software with the total companies using ***desktop*** software is 12.9%.

It is seen from the table that there are 9 companies using ***standard pharmaceutical*** software for marketing and sales and 2 companies not using ***standard pharmaceutical*** software for marketing and sales. The percentage of companies not using ***standard pharmaceutical*** software with the total companies not using ***standard pharmaceutical*** software is 10.00%. The percentage of companies using ***standard pharmaceutical*** software with the total companies using ***standard pharmaceutical*** software is 14.5%.

4.12 Software Use for marketing and sales

Type of Software use to execute your daily operation		Marketing and Sales	
		No	Yes
Commercial	Count	6	11
	percentage	30.0%	17.7%
Desktop	Count	3	8
	percentage	15.0%	12.9%
Standard pharmaceutical	Count	2	9
	percentage	10.0%	14.5%
ERP	Count	6	25
	percentage	30.0%	40.3%
Home made	Count	3	8
	percentage	15.0%	12.9%
E-commerce	Count	0	1
	percentage	.0%	1.6%
Total	Count	20	62
	percentage	100.0%	100.0%

It is seen from the table that there are 25 companies using ***ERP*** software for

marketing and sales and 6 companies not using ***ERP*** software for marketing and sales. The percentage of companies not using ***ERP*** software with the total companies not using ***ERP*** software is 30.00%. The percentage of companies using ***ERP*** software with the total companies using ***ERP*** software is 40.3%.

It is seen from the table that there are 8 companies using ***home made*** software for marketing and sales and 3 companies not using ***home made*** software for marketing and sales. The percentage of companies not using ***home made*** software with the total companies not using ***home made*** software is 15.00%. The percentage of companies using ***home made*** software with the total companies using ***home made*** software is 12.9%.

It is seen from the table that there is 1 company using ***e-commerce*** software for marketing and sales and no company not using ***e-commerce*** software for marketing and sales. The percentage of companies not using ***e-commerce*** software with the total companies not using ***e-commerce*** software is 0.00%. The percentage of companies using ***e-commerce*** software with the total companies using ***e-commerce*** software is 1.6%.

4.5.8 Count and percentages of companies using software for manufacturing

The following table gives the count and the percentages of the companies using different software for manufacturing and also it's cross tabulation with companies not using it for manufacturing. It is seen from the table that there are 5 companies using ***commercial*** software for manufacturing and 12 companies not using ***commercial*** software for manufacturing. The percentage of companies not using ***commercial*** software with the total companies not using ***commercial*** software is 17.9%. The percentage of companies using ***commercial*** software with the total companies using ***commercial*** software is 33.3%.

It is seen from the table that there is 1 company using ***desktop*** software for manufacturing and 10 companies not using ***desktop*** software for manufacturing. The percentage of companies not using ***desktop*** software with the total companies not using ***desktop*** software is 14.9%. The percentage of companies using ***desktop*** software with the total companies using ***desktop*** software is 6.7%.

It is seen from the table that there are 2 companies using

standard pharmaceutical software for manufacturing and 9 companies not using ***standard pharmaceutical*** software for manufacturing. The percentage of companies not using ***standard pharmaceutical*** software with the total companies not using ***standard pharmaceutical*** software is 13.4%. The percentage of companies using ***standard pharmaceutical*** software with the total companies using ***standard pharmaceutical*** software is 13.3%.

It is seen from the table that there are 6 companies using ***ERP*** software for manufacturing and 25 companies not using ***ERP*** software for marketing and sales. The percentage of companies not using ***ERP*** software with the total companies not using ***ERP*** software is 37.3%. The percentage of companies using ***ERP*** software with the total companies using ***ERP*** software is 40.0%.

4.13 Type of Software use for manufacturing

Type of Software use to execute daily operation		Manufacturing	
		No	Yes
Commercial	Count	12	5
	Percentage	17.9%	33.3%
Desktop	Count	10	1
	Percentage	14.9%	6.7%
Standard pharmaceutical	Count	9	2
	Percentage	13.4%	13.3%
ERP	Count	25	6
	Percentage	37.3%	40.0%
Home made	Count	10	1
	Percentage	14.9%	6.7%
E-commerce	Count	1	0
	Percentage	1.5%	.0%
Total	Count	67	15
	Percentage	100.0%	100.0%

It is seen from the table that there is 1 company using ***home made*** software for manufacturing and 10 companies not using ***home made*** software for manufacturing. The percentage of companies not using ***home made*** software

with the total companies not using ***home made*** software is 14.9%. The percentage of companies using ***home made*** software with the total companies using ***home made*** software is 6.7%.

It is seen from the table that there is 1 company using ***e-commerce*** software for manufacturing and no company not using ***e-commerce*** software for marketing and sales. The percentage of companies not using ***e-commerce*** software with the total companies not using ***e-commerce*** software is 1.5%. The percentage of companies using ***e-commerce*** software with the total companies using ***e-commerce*** software is 0.0%.

4.5.9 Count and percentages of companies using type of software for advertising

The following table gives the count and the percentages of the companies using different software for advertising and also it's cross tabulation with companies not using it for advertising. It is seen from the table that there are 4 companies using ***commercial*** software for advertising and 13 companies not using ***commercial*** software for advertising. The percentage of companies not using ***commercial*** software with the total companies not using ***commercial*** software is 22.0%. The percentage of companies using ***commercial*** software with the total companies using ***commercial*** software is 17.4%.

It is seen from the table that there are 2 companies using ***desktop*** software for advertising and 9 companies not using ***desktop*** software for advertising. The percentage of companies not using ***desktop*** software with the total companies not using ***desktop*** software is 15.3%. The percentage of companies using ***desktop*** software with the total companies using ***desktop*** software is 8.7%.

It is seen from the table that there is 1 company using ***standard pharmaceutical*** software for advertising and 10 companies not using ***standard pharmaceutical*** software for advertising. The percentage of companies not using ***standard pharmaceutical*** software with the total companies not using ***standard pharmaceutical*** software is 16.9%. The percentage of companies using ***standard pharmaceutical*** software with the total companies using ***standard pharmaceutical*** software is 4.3%.

It is seen from the table that there are 11 companies using ***ERP*** software for advertising and 20 companies not using ***ERP*** software for advertising. The percentage of companies not using ***ERP*** software with the total companies not using ***ERP*** software is 33.9%. The percentage of companies using ***ERP*** software with the total companies using ***ERP*** software is 47.8%.

4.14 Type of Software use for Advertising

Type of Software use to execute your daily operation		Advertising	
		No	Yes
Commercial	Count	13	4
	Percentage	22.0%	17.4%
Desktop	Count	9	2
	Percentage	15.3%	8.7%
Standard pharmaceutical	Count	10	1
	Percentage	16.9%	4.3%
ERP	Count	20	11
	Percentage	33.9%	47.8%
Home made	Count	6	5
	Percentage	10.2%	21.7%
E-commerce	Count	1	0
	Percentage	1.7%	.0%
Total	Count	59	23
	Percentage	100.0%	100.0%

It is seen from the table that there is 5 companies using ***home made*** software for advertising and 6 companies not using ***home made*** software for advertising. The percentage of companies not using ***home made*** software with the total companies not using ***home made*** software is 10.2%. The percentage of

companies using ***home made*** software with the total companies using ***home made*** software is 21.7%.

It is seen from the table that there is 1 company using ***e-commerce*** software for advertising and no company not using ***e-commerce*** software for advertising. The percentage of companies not using ***e-commerce*** software with the total companies not using ***e-commerce*** software is 1.7%. The percentage of companies using ***e-commerce*** software with the total companies using ***e-commerce*** software is 0.0%. The table shows that there are total 59 companies not using e-commerce and 23 companies using all the software for advertising.

4.5.10 Count and percentages of companies using different software for human resource

The following table gives the count and the percentages of the companies using different software for **human resource** and also it's cross tabulation with companies not using it for **human resource**. It is seen from the table that there are 3 companies using ***commercial*** software for advertising and 14 companies not using ***commercial*** software for advertising. The percentage of companies not using ***commercial*** software with the total companies not using ***commercial*** software is 21.2%. The percentage of companies using ***commercial*** software with the total companies using ***commercial*** software is 18.8%.

It is seen from the table that there are 3 companies using ***desktop*** software for advertising and 8 companies not using ***desktop*** software for advertising. The percentage of companies not using ***desktop*** software with the total companies not using ***desktop*** software is 12.1%. The percentage of companies using ***desktop*** software with the total companies using ***desktop*** software is 18.8%.

It is seen from the table that there is 1 company using ***standard pharmaceutical*** software for human resource and 10 companies not using ***standard pharmaceutical*** software for human resource. The percentage of companies not using ***standard pharmaceutical*** software with the total companies not using ***standard pharmaceutical*** software is 15.2%. The percentage of companies using ***standard pharmaceutical*** software with the total

companies using ***standard pharmaceutical*** software is 6.3%.

It is seen from the table that there are 5 companies using ***ERP*** software for human resource and 26 companies not using ***ERP*** software for human resource. The percentage of companies not using ***ERP*** software with the total companies not using ***ERP*** software is 39.4%. The percentage of companies using ***ERP*** software with the total companies using ***ERP*** software is 31.3%.

It is seen from the table that there is 4 companies using ***home made*** software for human resource and 7 companies not using ***home made*** software for advertising. The percentage of companies not using ***home made*** software with the total companies not using ***home made*** software is 10.6%. The percentage of companies using ***home made*** software with the total companies using ***home made*** software is 25.0%.

4.15 Type of Software use for human Resource

Type of Software use to execute your daily operation		Human Resource	
		No	Yes
Commercial	Count	14	3
	Percentage	21.2%	18.8%
Desktop	Count	8	3
	Percentage	12.1%	18.8%
Standard pharmaceutical	Count	10	1
	Percentage	15.2%	6.3%
ERP	Count	26	5
	Percentage	39.4%	31.3%
Home made	Count	7	4
	Percentage	10.6%	25.0%
E-commerce	Count	1	0
	Percentage	1.5%	.0%
Total	Count	66	16
	Percentage	100.0%	100.0%

It is seen from the table that there is 1 company using ***e-commerce*** software for human resource and no company not using ***e-commerce*** software

for advertising. The percentage of companies not using ***e-commerce*** software with the total companies not using ***e-commerce*** software is 1.5%. The percentage of companies using ***e-commerce*** software with the total companies using ***e-commerce*** software is 0.0%. The table shows that there are total 66 companies not using e-commerce and 16 companies using all the software for human resource.

4.5.11 Count and the percentages of the companies using Type of software for research

The following table gives the count and the percentages of the companies using different software for **research** and also it's cross tabulation with companies not using it for **research**. It is seen from the table that there are 4 companies using ***commercial*** software for research and 13 companies not using ***commercial*** software for research. The percentage of companies not using ***commercial*** software with the total companies not using ***commercial*** software is 20.3%. The percentage of companies using ***commercial*** software with the total companies using ***commercial*** software is 22.2%.

It is seen from the table that there are 1 company using ***desktop*** software for research and 10 companies not using ***desktop*** software for research. The percentage of companies not using ***desktop*** software with the total companies not using ***desktop*** software is 15.6%. The percentage of companies using ***desktop*** software with the total companies using ***desktop*** software is 5.6%.

It is seen from the table that there is 3 company using ***standard pharmaceutical*** software for research and 8 companies not using ***standard pharmaceutical*** software for research. The percentage of companies not using ***standard pharmaceutical*** software with the total companies not using ***standard pharmaceutical*** software is 12.5%. The percentage of companies using ***standard pharmaceutical*** software with the total companies using ***standard pharmaceutical*** software is 16.7%.

It is seen from the table that there are 6 companies using ***ERP*** software for research and 25 companies not using ***ERP*** software for research. The percentage of companies not using ***ERP*** software with the total companies not using ***ERP*** software is 39.1%. The percentage of companies using ***ERP***

software with the total companies using ***ERP*** software is 33.3%.

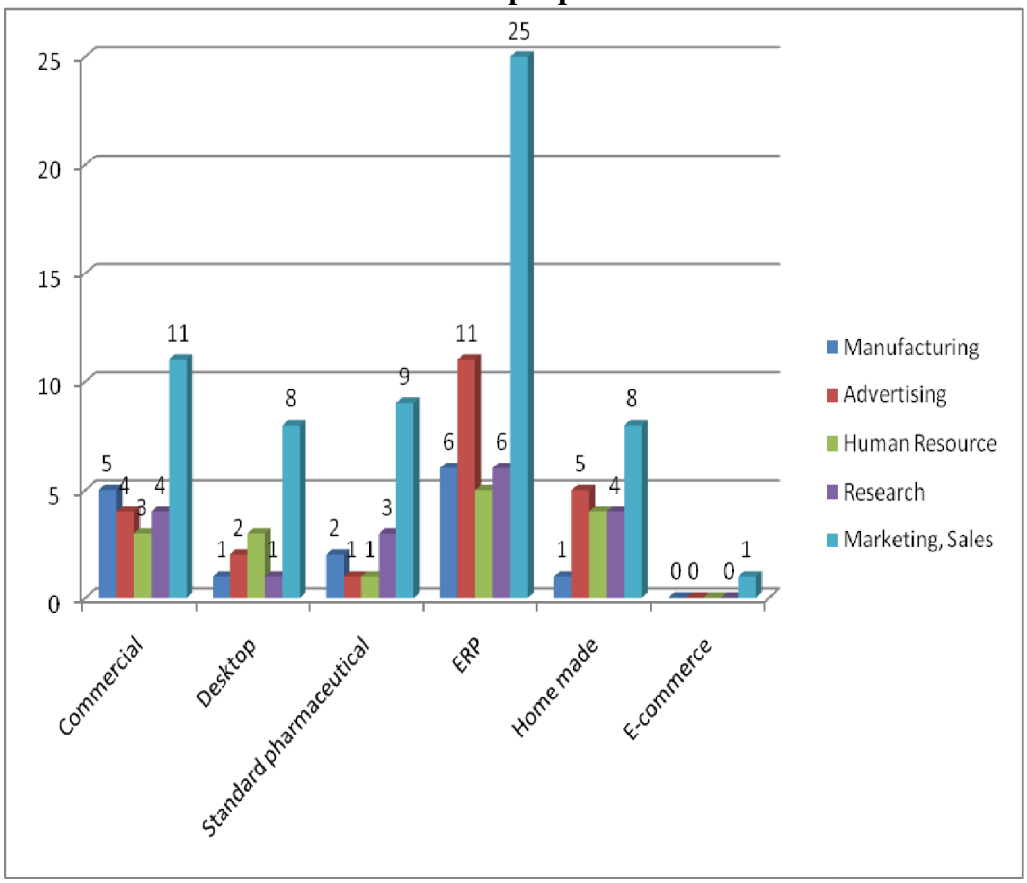
It is seen from the table that there is 4 companies using ***home made*** software for human resource and 7 companies not using ***home made*** software for research. The percentage of companies not using ***home made*** software with the total companies not using ***home made*** software is 10.9%. The percentage of companies using ***home made*** software with the total companies using ***home made*** software is 22.2%.

4.16 Type of software use for research

Type of Software use to execute your daily operation		Research	
		No	Yes
Commercial	Count	13	4
	Percentage	20.3%	22.2%
Desktop	Count	10	1
	Percentage	15.6%	5.6%
Standard pharmaceutical	Count	8	3
	Percentage	12.5%	16.7%
ERP	Count	25	6
	Percentage	39.1%	33.3%
Home made	Count	7	4
	Percentage	10.9%	22.2%
E-commerce	Count	1	0
	Percentage	1.6%	.0%
Total	Count	64	18
	Percentage	100.0%	100.0%

It is seen from the table that there is 1 company using ***e-commerce*** software but it is not using it for research. The percentage of companies not using ***e-commerce*** software with the total companies not using ***e-commerce*** software is 1.6%. The percentage of companies using ***e-commerce*** software with the total companies using ***e-commerce*** software is 0.0%. The table shows that there are total 64 companies not using e-commerce and 18 companies using all the software for research.

Graph 4.10: Count and percentages of the companies using Type of software for different purposes



4.5.12 Companies Not Using different software for e-commerce

From the following table it is seen that there are 6 companies which do not use commercial software for the use of any other purpose and there percentage is 30.00. There are 3 companies using desktop software for the use of any other purpose and there percentage is 15.00.There are two companies using standard pharmaceutical software but not using it for any other purpose and there percentage is 10.00. ERP software is used by 6 companies which is not used for any other purpose. There percentage is 30.00 Home made software is used by 3 companies which do not use it for any other purpose and there percentage is 15.00. No company uses e-commerce software for the use of any other purpose and its percentage is 0.0. Totally there are 20 companies using different software not for the use of e-commerce.

4.17 Companies Not Using different software for e-commerce

Type of Software use to execute your daily operation		Companies Not Using software for e-commerce
Commercial	Count	6
	Percentage	30.0%
Desktop	Count	3
	Percentage	15.0%
Standard pharmaceutical	Count	2
	Percentage	10.0%
ERP	Count	6
	Percentage	30.0%
Home made	Count	3
	Percentage	15.0%
E-commerce	Count	0
	Percentage	.0%
Total	Count	20
	Percentage	100.0%

4.5.13 Cross tabulation of type of software use with use of e-commerce

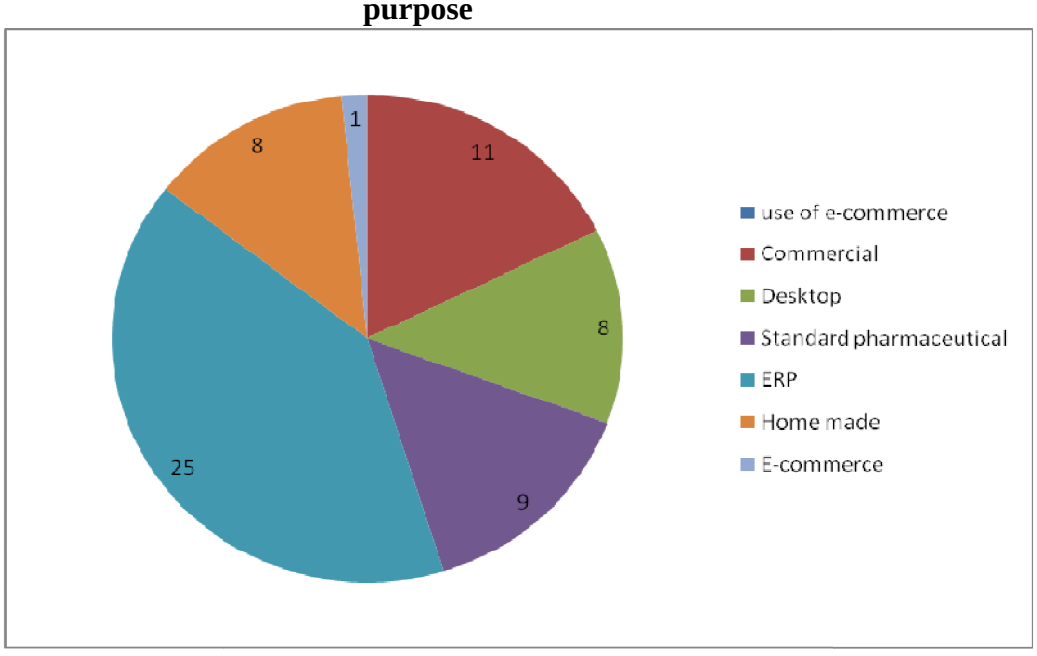
The following table gives cross tabulation of type of software with the total companies using it for e-commerce. From the table 4.18 it is seen that there are 11 companies using commercial software for the use of e-commerce and there percentage is 17.7.There are 8 companies using desktop software for the use of e-commerce or for any other purpose and there percentage is 12.9. There are 9 companies using standard pharmaceutical software for the use of e-commerce or for any other purpose and there percentage is 14.5. There are 25 companies using ERP software for the use of e-commerce or for any other purpose and there percentage is 40.3. There are 8 companies using home made software for the use of e-commerce or for any other purpose and there percentage is 12.9.

There is one company using e-commerce software which uses it for e-commerce and its percentage is 1.6. Also it is seen from the table that there are total 62 companies using different software for the use of e-commerce.

4.18 Companies Using different software for e-commerce and any other purpose

Type of Software use to execute your daily operation		Use e-commerce & Any Other Than This
Commercial	Count	11
	% within Use e-commerce	17.7%
Desktop	Count	8
	% within Use e-commerce	12.9%
Standard pharmaceutical	Count	9
	% within Use e-commerce	14.5%
ERP	Count	25
	% within Use e-commerce	40.3%
Home made	Count	8
	% within Use e-commerce	12.9%
E-commerce	Count	1
	% within Use e-commerce	1.6%
Total	Count	62
	% within Use e-commerce	100.0%

Graph 4.11: Type of Software use for e-commerce and for any other purpose



4.5.14 Companies using different type of software for different purposes

The following table shows cross tabulation of total companies using different types of software for different purposes like marketing and sales, manufacturing, advertising, human resource, home made and e-commerce. The table shows there are total 17 companies using commercial software and their percentage is 20.7 with the total pharmaceutical companies. According to the table ERP software is used by total 31 companies and its percentage to the total is 37.8. Home made, desktop and standard pharmaceutical software is used by 11 companies and their percentage with the total is 13.4. E-commerce software is used by only one company and its percentage is 1.2.

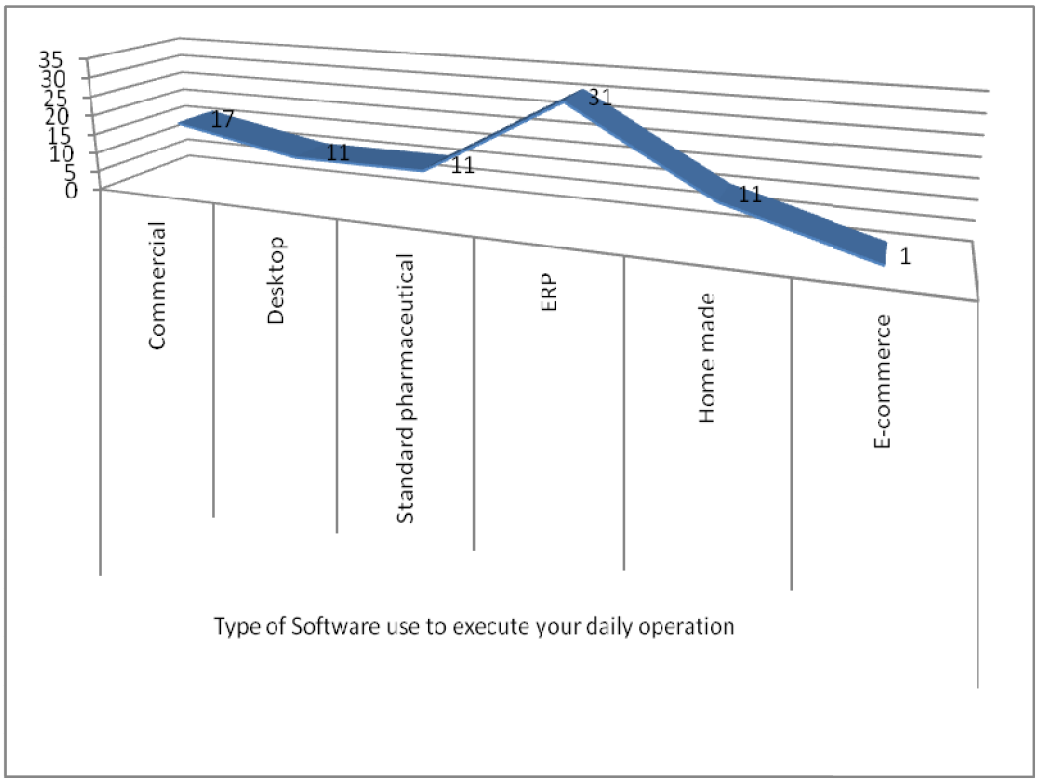
4.19 Companies using different type of software for different purposes

Type of Software use to execute your daily operation		Total
Commercial	Count	17
	% within Use e-commerce	20.7%
Desktop	Count	11
	% within Use e-commerce	13.4%
Standard pharmaceutical	Count	11
	% within Use e-commerce	13.4%
ERP	Count	31
	% within Use e-commerce	37.8%
Home made	Count	11
	% within Use e-commerce	13.4%
E-commerce	Count	1
	% within Use e-commerce	1.2%
Total	Count	82
	% within Use e-commerce	100.0%

This is shown using the following line graph which shows the peak at ERP

software which is used the most.

Graph 4.12: Companies using type of software for different purposes



4.6 Use of e-commerce in different pharmaceutical industries

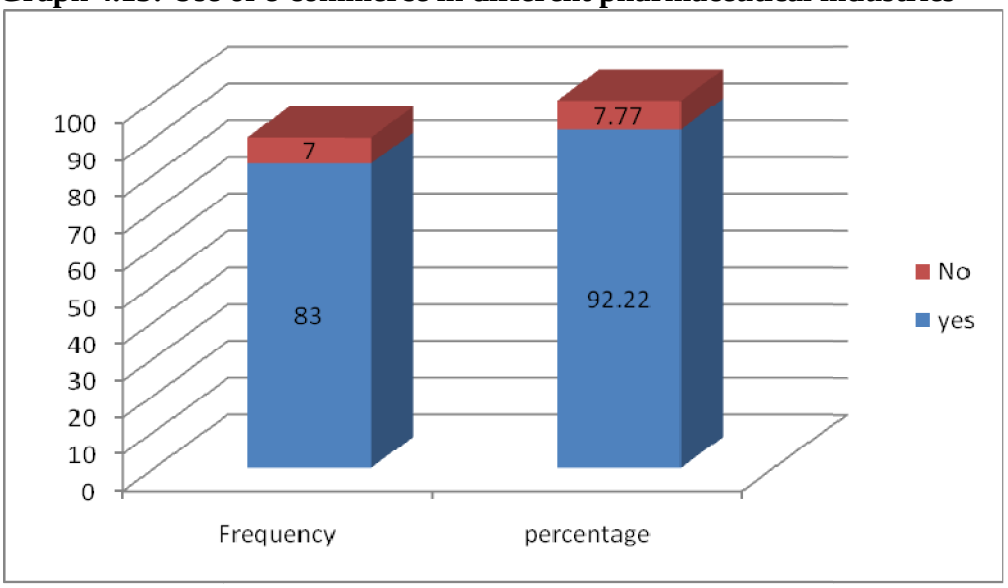
It is seen from the following table that percentage use of e-commerce is 92.22 percent and its frequency is 83 i.e. number of companies using e-commerce are high while only few companies do not use e-commerce.

4.20 Use of e-commerce in different pharmaceutical industries

Yes/No	Use of E-commerce	
	Frequency	Percentage
Yes	83	92.22
No	7	7.77
Total	90	100

It has been shown pictorially using the following graph.

Graph 4.13: Use of e-commerce in different pharmaceutical industries



4.7 Benefits of E-commerce for the different user groups

The next table gives the figures of benefits obtained by different types of business people. It shows that suppliers are the people who are benefited the most and the percentage of it is 31.7%. Next to that distributors are benefited and their percent is 30.5%. Next to that management people are benefited and their percent is 14.6%. End users are people who are benefited next to that and their percent is 11.00%. Government agencies and manufacturers are the least benefited person and their percent is 2.4%.

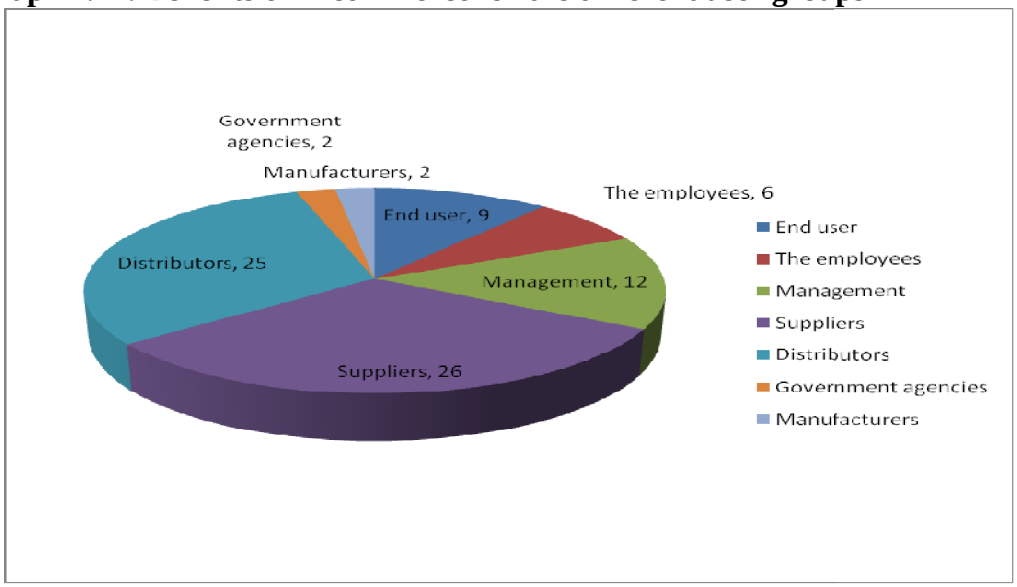
4.21 E-commerce is benefited for (0-(lowest)-5 (highest))

Benefited for	Frequency	Percent
End user	9	11.0
The employees	6	7.3
Management	12	14.6
Suppliers	26	31.7
Distributors	25	30.5
Government agencies	2	2.4
Manufacturers	2	2.4
Total	82	100.0

The following pie graph shows the use of e-commerce for end users, employees, management, suppliers, distributors, government agencies and manufacturers. It

shows that suppliers are benefited the most, distributors are benefited comparatively less. Management is benefited less 14.6% use. End user is benefited still less with 11.0%. Employees are benefited still less with 7.3%. Government agencies and manufacturers are benefited the least with use equal to 2.4.

Graph 4.14: Benefits of E-commerce for the different user groups



4.8 Use of e-commerce for different purposes in pharmaceutical industry

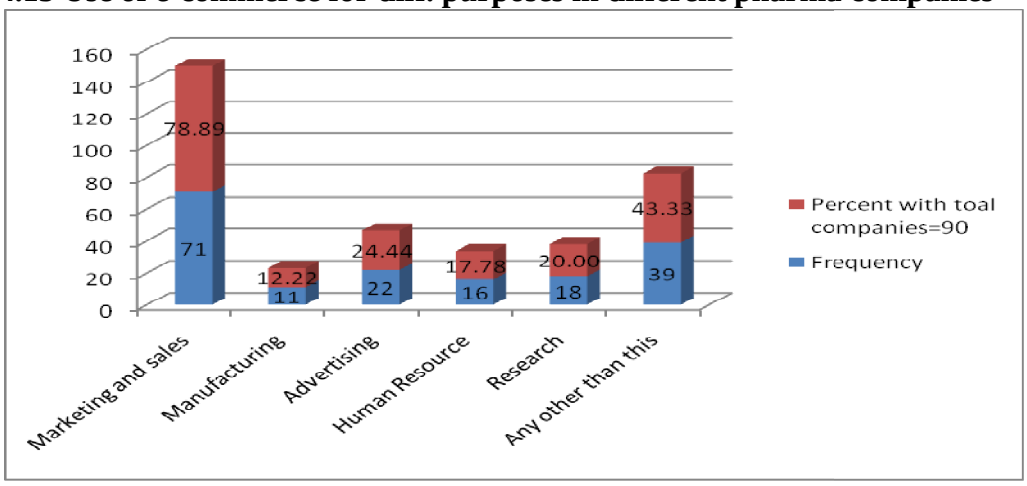
The following table gives Use of e-commerce for different purposes in the pharmaceutical industry. It is seen from the following table that the frequency

4.22 Use of e-commerce for different purposes in pharmaceutical industry

Purpose	Frequency	Percentage of companies using it for diff. purposes with total (90) companies =Freq/90*100	Percent use for diff. purposes with total use =Freq/177*100
1) Marketing and sales	71	78.89	40.11
2) Manufacturing	11	12.22	6.21
3) Advertising	22	24.45	12.42
4) Human Resource	16	17.78	09.03
5) Research	18	20.00	10.16
6) Any other than this	39	43.33	22.03

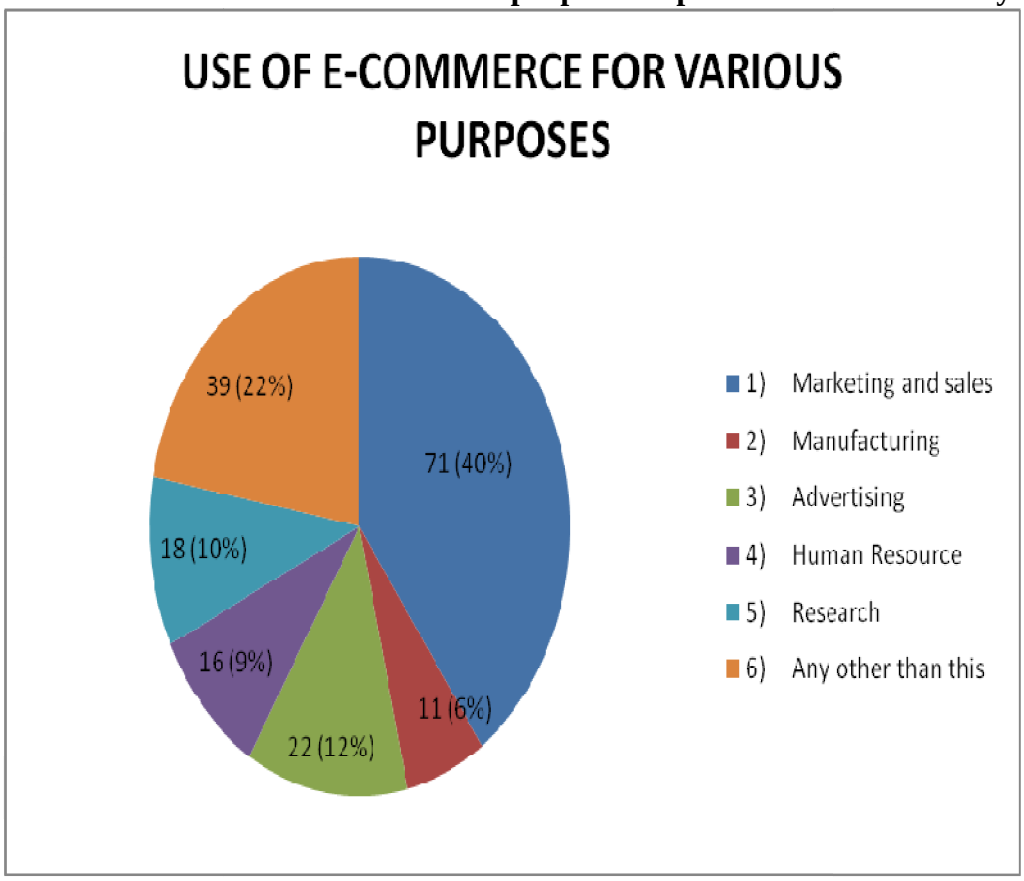
and percentage of use of e-commerce for marketing and sales is the highest and it is 71 and 40 percent which is the highest. For manufacturing the use is only 6 percent which is very less.

4.15 Use of e-commerce for diff. purposes in different pharma companies



The following pie graph shows pictorially explains the above table.

4.16 : Use of e-commerce for different purposes in pharmaceutical industry



4.9 Applications of e-commerce in the areas of pharmaceutical industry

As seen from the table, there are different applications of e-commerce which are beneficial to different companies. There are total 9 applications which are useful in the pharmaceutical industry. First application is ***"Expanded Geographical Use"***. Many companies are benefited from this application. Five companies (6.1%) are not benefited by this application. 13 companies (16%) have made very low use of this application. 3 companies (3.7%) are having low benefit by this application. 8 companies (9.8%) have average, 16 companies (20%) have high and 37 companies (46%) have very high benefit from the application of **"Expanded Geographical Use"**.

Second application is of **"Expanded customer base"** 2 companies (2.4%) are not benefited from this application. 2 companies (2.4%) are having very low benefit from this application. 4 companies (4.9%) are having low application, 18 companies (22%) are having average benefit, 24 companies (29%) are having high benefit as well as 32 companies (39%) are having very high expanded customer base.

Third application is of **"Increase visibility through search engine marketing"** 5 companies (6.1%) are not benefited from this application. 2 companies (2.4%) are having very low benefit from this application. 6 companies (7.3%) are having low application, 10 companies (12%) are having average benefit, 27 companies (33%) are having high benefit as well as 32 companies (39%) are having very high **Increase visibility through search engine marketing.**

Fourth application is of **"Provide customer valuable business information"** 2 companies (2.44%) are not benefited from this application. 2 companies (2.44%) are having very low benefit from this application. 16 companies (19.5%) are having low application, 9 companies (11%) are having average benefit, 28 companies (34.1%) are having high benefit as well as 25 companies (30.5%) are having very high **Provide customer valuable business information.**

Fifth application is of **"Available 24/7/365 never close"** 2 companies (2.4%) are not benefited from this application. 1 companies (1.2%) are having

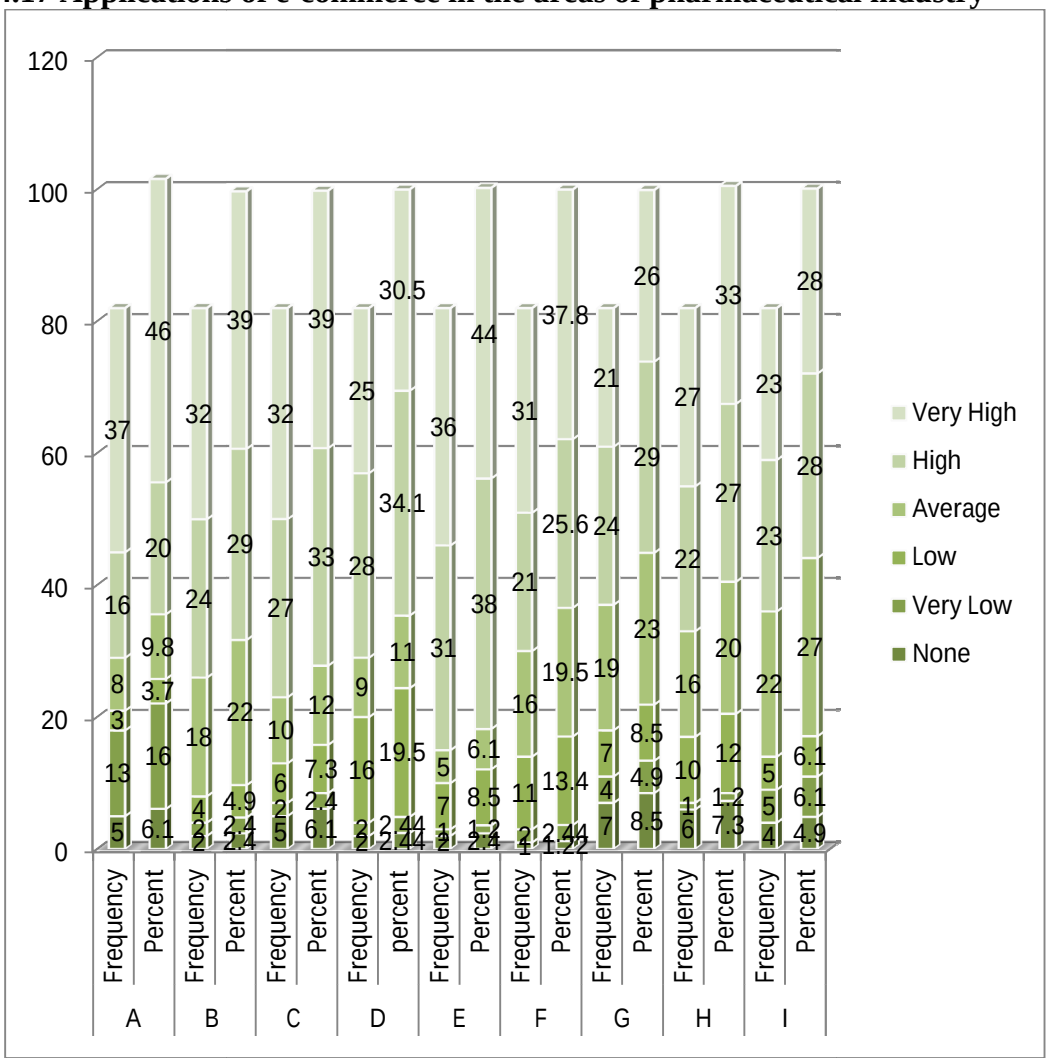
very low benefit from this application. 7 companies (8.5%) are having low application, 5 companies (6.1%) are having average benefit, 31 companies (38%) are having high benefit as well as 36 companies (44%) are having very high **Available 24/7/365 never close.**

4.23 Applications of e-commerce in the areas of pharmaceutical industry

Applications		None	Very Low	Low	Average	High	Very High	Total
Expanded Geographical Use	Frequency	5	13	3	8	16	37	82
	Percent	6.1	16	3.7	9.8	20	46	100
Expanded customer base	Frequency	2	2	4	18	24	32	82
	Percent	2.4	2.4	4.9	22	29	39	100
Increase visibility through search engine marketing	Frequency	5	2	6	10	27	32	82
	Percent	6.1	2.4	7.3	12	33	39	100
Provide customer valuable business information	Frequency	2	2	16	9	28	25	82
	percent	2.44	2.44	19.5	11	34.1	30.5	100
Available 24/7/365 never close	Frequency	2	1	7	5	31	36	82
	Percent	2.4	1.2	8.5	6.1	38	44	100
Provide customer valuable info	Frequency	1	2	11	16	21	31	82
	Percent	1.22	2.44	13.4	19.5	25.6	37.8	100
Build customer loyalty	Frequency	7	4	7	19	24	21	82
	Percent	8.5	4.9	8.5	23	29	26	100
Reduction of marketing and advertising cost	Frequency	6	1	10	16	22	27	82
	Percent	7.3	1.2	12	20	27	33	100
Collection of customer data	Frequency	4	5	5	22	23	23	82
	Percent	4.9	6.1	6.1	27	28	28	100

Sixth application is of **"Provide customer valuable info"** 1 companies (1.22%) are not benefited from this application. 2 companies (2.44%) are having very low benefit from this application. 11 companies (13.4%) are having low application, 16 companies (19.5%) are having average benefit, 21 companies (25.6%) are having high benefit as well as 31 companies (37.8%) are having very high

4.17 Applications of e-commerce in the areas of pharmaceutical industry



Where A- Expanded geographical use, B - Expanded customer base, C- Increase visibility through search engine marketing, D - Provide customer valuable business information, E- Available 24/7/365 never close, F- Provide customer valuable info, G- Build customer loyalty, H- Reduction of marketing and advertising cost, I - Collection of customer data

Provide customer valuable info.

Eighth application is of **"Reduction of marketing and advertising cost"** 6 companies (7.3%) are not benefited from this application.1 companies (1.2%) are having very low benefit from this application. 10 companies (12%) are having low application, 16 companies (20%) are having average benefit, 22 companies (27%) are having high benefit as well as 27 companies (33%) are

having very high **Reduction of marketing and advertising cost.**

Ninth application is of **"Collection of customer data"** 4 companies (4.9%) are not benefited from this application.5 companies (6.1%) are having very low benefit from this application. 5 companies (6.1%) are having low application, 22 companies (27%) are having average benefit, 23 companies (28%) are having high benefit as well as 23 companies (28%) are having very high **Collection of customer data.**

4.10 E-commerce helps in the process of implementation

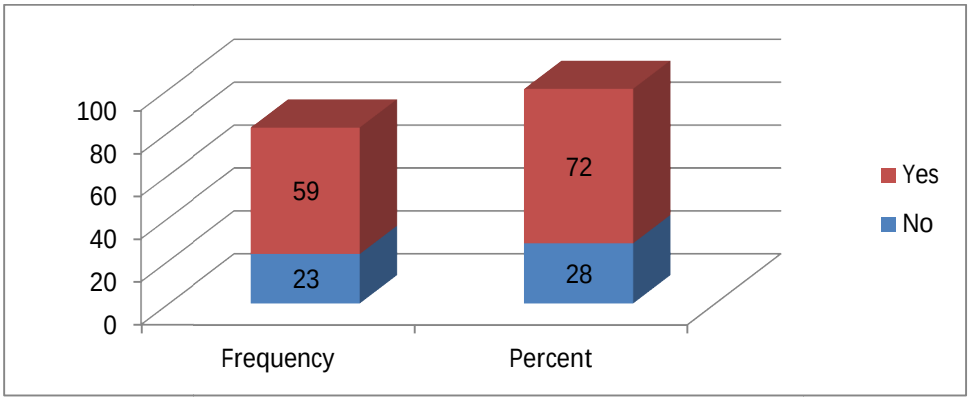
This table gives the figures of process of implementation, whether e-commerce help in process of implementation. Figures show that e-commerce helps in process of implementation and its percent is 72%. On the other hand in few cases it does not help in the process of implementation and its percent is 28%.

4.24 e-commerce helps in process implementation

	Frequency	Percent	Valid Percent	Cumulative Percent
No	23	28.0	28.0	28.0
Yes	59	72.0	72.0	100.0
Total	82	100.0	100.0	

The following bar graph shows that the numbers of organizations which are benefited by e-commerce for the process of implementation are more (72%) than the organizations which are not getting benefited by the process of implementation (28%).

Graph 4.18: E- commerce helps in the process of implementation



4.11 E-commerce enables process of manufacturing and sales

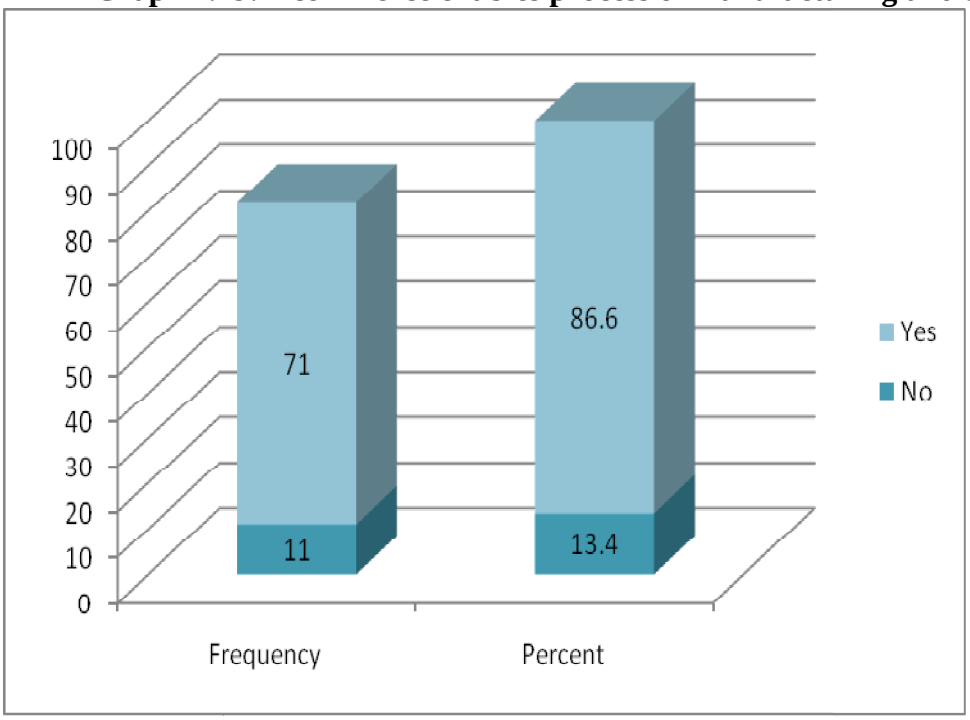
4.11.1 Use of E-commerce for manufacturing and sales

The following table shows the frequency and percentage of the pharmaceutical companies which enable process of manufacturing and sales. According to the table number of pharmaceutical companies in which e-commerce enables process of manufacturing and sales are 71 out of 82 e-commerce using companies. Number of pharmaceutical companies in which e-commerce does not enable process of manufacturing and sales are 11 out of 82 e-commerce using companies. This shows that in 86.6 percent companies' e-commerce enables process of manufacturing and sales while only in 13.4 companies e-commerce does not allow the process of manufacturing and sales.

4.25 E-commerce enables process of manufacturing and sales

E-commerce helps process of manufacturing and sales	Frequency	Percent
No	11	13.4
Yes	71	86.6
Total	82	100.0

Graph 4.19:E-commerce enables process of manufacturing and sales



4.11.2 Correlations of use of e-commerce values with marketing and sales, manufacturing and advertising

The following table shows the correlations of use of e-commerce values with marketing and sales percentages. It is seen that the value of Pearson correlation value of marketing and sales for the use of e-commerce is 1 which shows there is ***perfect positive correlation*** between the two. This shows that variables are rising in the same direction i.e. ***as the use of e-commerce increases marketing and sales percentage increases.*** Whereas significant level 2 tailed correlation values of manufacturing and advertising .are .122 and 0.139 shows that correlation is significant at the ***0.01*** level.

Second row shows use of e-commerce for marketing correlated to marketing and sales, and its value is negative -.172 showing ***weak positive correlation***. Correlation with Manufacturing shows perfect positive correlation with value equal to 1 while correlation with advertising shows ***weak positive correlation*** with negative value -.225. Where as significant level 2 tailed correlation values of marketing and sales and advertising .are .122 and 0.42 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

The third row shows Pearson correlation of use of e-commerce for advertising with use of e-commerce for marketing, manufacturing and advertising. Its value for marketing is 0.165 showing weak positive correlation. The value for manufacturing is -.225 showing weak negative correlation. While for advertising the value is 1 showing perfect positive correlation. Where as significant level 2 tailed correlation values of marketing and sales and advertising .are .139 and 0.42 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

The fourth row shows Pearson correlation values for use of e-commerce for human resource with use of e-commerce for marketing, manufacturing and advertising. Its value for marketing, manufacturing and advertising are 0.208, .165 and .172 respectively showing ***weak positive correlation***. Where as

4.26 Correlations of use of e-commerce for all purposes with marketing and sales, manufacturing and advertising

Use of e-commerce for different purposes	Correlation	use e-commerce Marketing, Sales	use e-commerce-Manufacturing	use e-commerce-Advertising
use e-commerce - Marketing, Sales	Pearson Correlation	1	-.172	.165
	Sig. (2-tailed)		.122	.139
	N	82	82	82
use e-commerce-Manufacturing	Pearson Correlation	-.172	1	-.225*
	Sig. (2-tailed)	.122		.042
	N	82	82	82
use e-commerce-Advertising	Pearson Correlation	.165	-.225*	1
	Sig. (2-tailed)	.139	.042	
	N	82	82	82
use e-commerce-.Human Resource	Pearson Correlation	.208	.165	.172
	Sig. (2-tailed)	.061	.138	.122
	N	82	82	82
use e-commerce-Research	Pearson Correlation	.095	.283*	.062
	Sig. (2-tailed)	.394	.010	.578
	N	82	82	82
Use e-commerce-Any other purpose	Pearson Correlation	1.000**	-.172	.165
	Sig. (2-tailed)	.000	.122	.139
	N	82	82	82

**. Correlation is significant at 0.01 level (2-tailed).
*. Correlation is significant at 0.05 level (2-tailed).

2-tailed correlation values of marketing, manufacturing and advertising are .061,.138 and 0.122 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

The fifth row shows Pearson correlation values for use of e-commerce for research with use of marketing, manufacturing and advertising. Its value for marketing, manufacturing and advertising are 0.95, .283 and .062 respectively showing ***weak positive correlation***. Where as significant level 2 tailed correlation values of marketing, manufacturing and advertising .are .394,.010 and 0.578 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

The sixth row shows Pearson correlation values for use of e-commerce for any other purpose with use of e-commerce for marketing, manufacturing and

advertising. Its value for marketing, manufacturing and advertising are 1.00 (***perfect positive correlation***), -.172 (***weak negative correlation***) and .062 respectively (***weak positive correlation)***. Where as significant level 2 tailed correlation values of marketing, manufacturing and advertising .are .00,.122 and 0.139 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

4.11.3 Correlations of use of e-commerce values with human resource, research and any other purpose

The following table shows the correlations of use of e-commerce values of marketing and sales with human resource, research and any other purpose. First row shows use of e-commerce for marketing correlated to human resource and research, and its values are .095 showing ***weak positive correlation*** respectively. Correlation with any other purpose shows perfect positive correlation with value equal to 1. Where as significant level 2 tailed correlation values of human resource, research and any other purpose are .061 and 0.394,.000 respectively shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

Second row shows use of e-commerce for marketing correlated to human resource, research, and any other purpose their values are 0.172, .062, .165 showing ***weak positive correlation***. Where as significant level 2 tailed correlation values of human resource, research and any other purpose .are .122,.578 and 0.139 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

The third row shows Pearson correlation of use of e-commerce for advertising with use of e-commerce for human research, research and any other purpose. Its values for human research, research and any other purpose are .172, 0.062 and .165 showing ***weak positive correlation***. Where as significant level 2 tailed correlation values of human resource, research and any other purpose .are .122, .578 and 0.139 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

The fourth row shows Pearson correlation values for use of e-commerce for human resource with use of e-commerce for human resource, research and

any other purpose. Its value for human resource is 1 showing perfect positive correlation. The values for research and any other purpose are .334 and .208 respectively showing ***weak positive correlation***. Where as significant level 2 tailed correlation values of research and any other purpose are .002 and 0.061 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

4.27 Correlations of use of e-commerce for all purposes with human resource, research and any other purpose

Purpose for use of e-commerce	Correlation	use e-commerce-.Human Resource	use e-commerce-Research	Use e-commerce-Any other purpose
use e-commerce -Marketing, Sales	Pearson Correlation	.208	.095	1.000**
	Sig. (2-tailed)	.061	.394	.000
	N	82	82	82
use e-commerce-Manufacturing	Pearson Correlation	.165	.283*	-.172
	Sig. (2-tailed)	.138	.010	.122
	N	82	82	82
use e-commerce-Advertising	Pearson Correlation	.172	.062	.165
	Sig. (2-tailed)	.122	.578	.139
	N	82	82	82
use e-commerce-.Human Resource	Pearson Correlation	1	.334**	.208
	Sig. (2-tailed)		.002	.061
	N	82	82	82
use e-commerce-Research	Pearson Correlation	.334**	1	.095
	Sig. (2-tailed)	.002		.394
	N	82	82	82
Use e-commerce-Any other purpose	Pearson Correlation	.208	.095	1
	Sig. (2-tailed)	.061	.394	
	N	82	82	82

**. Correlation is significant at the 0.01. *. Correlation is significant at 0.05 level (2-tailed).

The fifth row shows Pearson correlation values for use of e-commerce for research with use of e-commerce for human resource, research and any other purpose. Its value for human resource and any other purpose are 0.334 and .095 respectively showing ***weak positive correlation*** while for research its value is 1 showing perfect positive correlation. Where as significant level 2 tailed correlation values of human resource and any other purpose are .002 and 0.394 shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

The sixth row shows Pearson correlation values for use of e-commerce for any other purpose with use of e-commerce for human resource, research and any other purpose. Its value for human resource and research are .208 and .095 showing ***weak positive correlation***. Where as value for any other purpose is 1 showing ***perfect positive correlation*** where as significant level 2 tailed correlation values of human resource and research are .061, .394 respectively. This shows that correlation is significant at the ***0.01 level*** for the sample of 82 pharmaceutical companies.

4.12 E-commerce is benefited for different kinds of people –

4.12.1 E–commerce is benefited for different categories of people

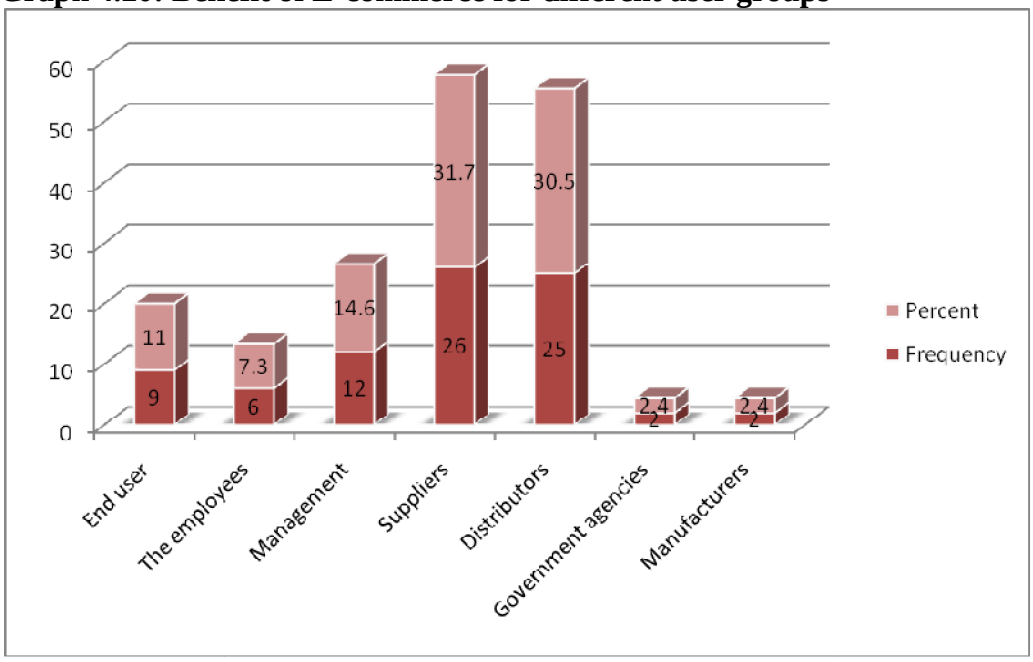
As seen from the following table e-commerce is benefited mostly for the suppliers and its frequency and percentage is 26 and 31.7. Next to it, it is benefited for distributors with frequency equal to 25 and percentage equal to 30.5. It is also beneficial to management to certain extent with frequency equal to 12 and percent equal to 14.6. It is also beneficial to end user to some extent with the frequency and percentage equal to 9 and 11 respectively. It is not that beneficial to the employees with frequency and percentage equal to 6 and 7.3 respectively. Government agencies and manufacturers are least benefited by e-commerce and their frequency and percentage is 2 and 2.4 respectively.

4.28 Benefit of E-commerce for different user groups

User group	Frequency	Percent
End user	9	11.0
The employees	6	7.3
Management	12	14.6
Suppliers	26	31.7
Distributors	25	30.5
Government agencies	2	2.4
Manufacturers	2	2.4
Total	82	100.0

The following bar graph shows the percentage of benefit of e-commerce for the employees, management, suppliers, distributors, government agencies and end user.

Graph 4.20: Benefit of E-commerce for different user groups



4.12.2 **Cross tabulation** of **Type of Software use & benefit of E-commerce**

This table gives the cross tabulation of benefited people for different types of software. Commercial software is benefited more for employees than the end users and it is benefited less for the management. Desktop software is benefited

the most for end users and it is not at all beneficial to employees and management. Standard pharmaceutical software is more beneficial to the management. It is less benefited to end user and employees. ERP software is highly beneficial to management (7) and comparative less beneficial to end user (3) and for employees it is least beneficial (2). Home made software is beneficial less beneficial to end users (1) and management (1) equally and it is not at all beneficial to the employees. E-commerce software is less beneficial to end user (1) and it is not beneficial to employees and management.

4.29 Type of Software Vs benefit of E-commerce for end user, employees & management

Type of Software use to execute your daily operation	E-commerce is benefited		
	End user	The employees	Management
Commercial	2	3	1
Desktop	1	0	0
Standard pharmaceutical	1	1	3
ERP	3	2	7
Home made	1	0	1
E-commerce	1	0	0
Total	9	6	12

4.12.3 Table showing cross tabulation values of benefits of e-commerce for suppliers, distributors and government agencies

Next table gives the cross tabulation for the benefits of different software to the suppliers, distributors and government agencies. Commercial software is benefited for distributors more (5) than suppliers (4) and it is less beneficial to the government agencies. Desktop software is more beneficial to distributors (6) and comparatively less beneficial to desktop (3) and it is not beneficial to government agencies. Standard pharmaceutical software is benefited to supplies the most (5), less beneficial to distributors and it is not beneficial to government agencies. ERP software is best for supplies (10) comparatively less beneficial to suppliers (8) and least beneficial to government agencies. Home made software

is more beneficial to distributors (5), comparatively less beneficial to suppliers (4) and not beneficial to government agencies. E-commerce software is not beneficial to suppliers, distributors and government agencies.

4.30 Type of Software use Vs E-commerce is benefited for suppliers, distributors and government agencies

Type of Software use to execute your daily operation	E-commerce is benefited		
	Suppliers	Distributors	Government agencies
Commercial	4	5	1
Desktop	3	6	0
Standard pharmaceutical	5	1	0
ERP	10	8	1
Home made	4	5	0
E-commerce	0	0	0
Total	26	25	2

4.12.4. Table showing cross tabulation values of benefits of e-commerce for suppliers, distributors and government agencies

This table gives the ratings how e-commerce is beneficial for the manufacturers using different software. Manufacturers are only benefited by commercial and desktop software. Other software like standard pharmaceutical, ERP, home made and e-commerce are not beneficial to manufacturers.

4.31 Type of Software use Vs E-commerce benefit for manufacturers

Type of Software use to execute your daily operation	E-commerce is benefited	
	Manufacturers	Total
Commercial	1	17
Desktop	1	11
Standard pharmaceutical	0	11
ERP	0	31
Home made	0	11
E-commerce	0	1
Total	2	82

4.12.5 The following table gives the distribution of percentage of applications of e-commerce

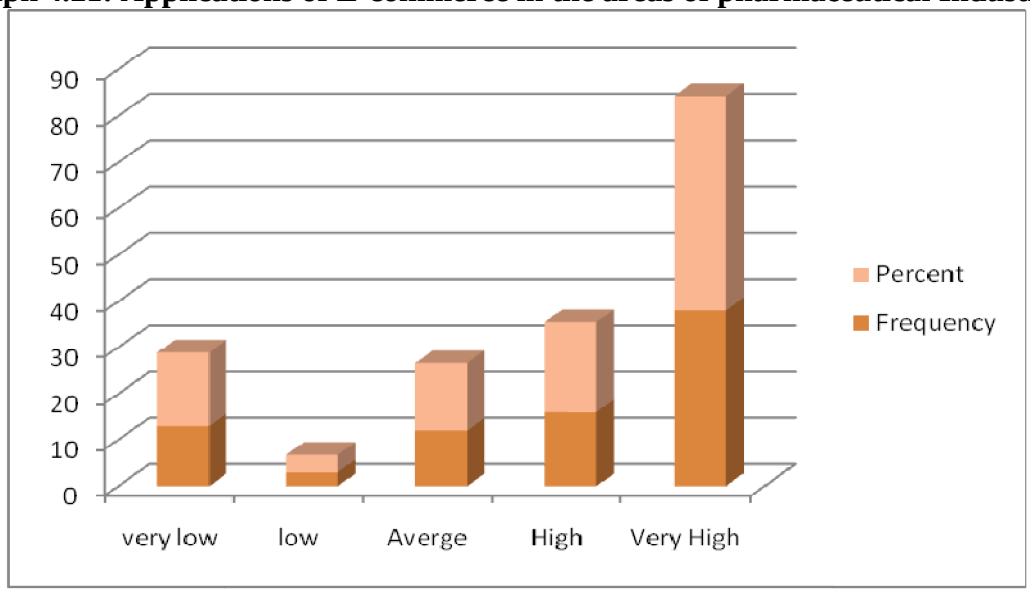
E-commerce use is very high in 46.3 percent organizations. E-commerce use is high in 19.5% organizations. It is average for 14.6% organizations. E-

commerce use is low for 3.7% organizations and very low for 15.9% organizations. The same has been shown graphically in the bar graph next to it.

4.32 Applications of E-commerce in the areas of pharmaceutical industry (Ratings 0(lowest)-5(highest))

Applications of e-commerce	Frequency	Percent
very low	13	15.9
Low	3	3.7
Average	12	14.6
High	16	19.5
very high	38	46.3
Total	82	100.0

Graph 4.21: Applications of E-commerce in the areas of pharmaceutical Industry

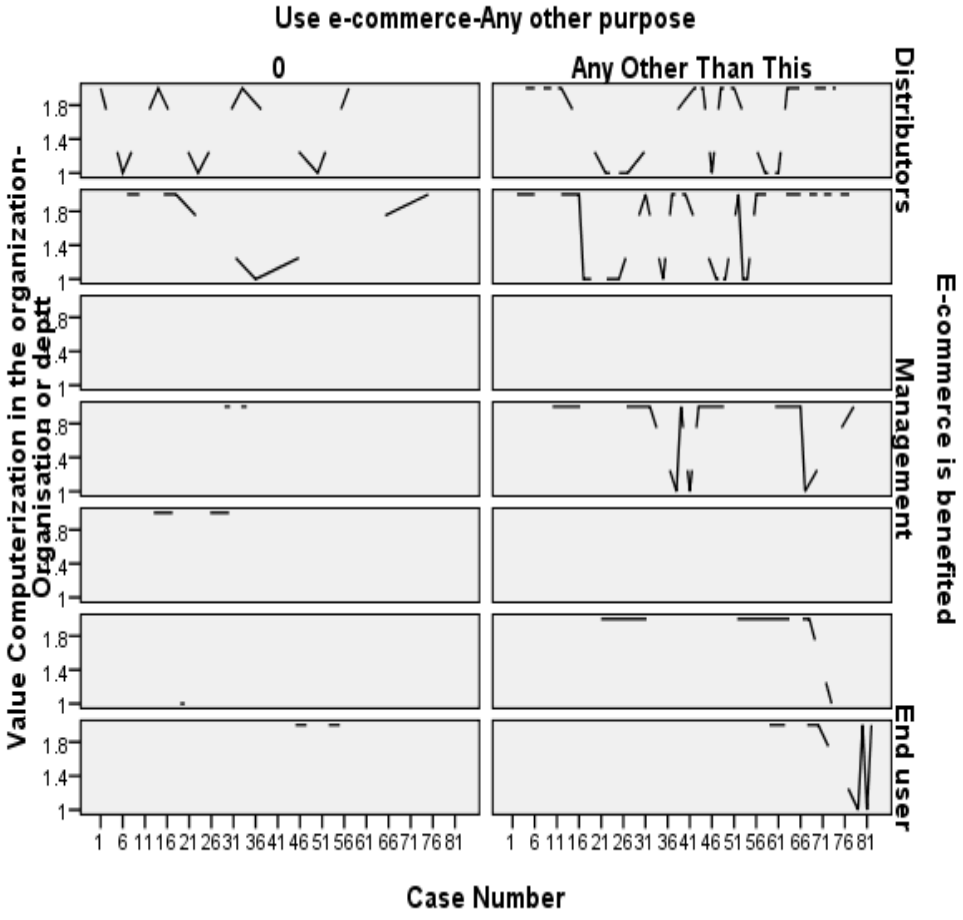


Case Processing Summary:

It is seen from the following figure that distributors are benefited the most as seen from the number of cases considered. Management is benefited less as compared to distributors. End user is benefited the least than distributors and management. Total 81 cases were considered. Also the diagram shows computerization done in the organization or department. It is seen that distributor companies are having the largest computerization. Manufacturers are having less amount of computerization. Management companies are having less

number of computerization in the organization. Where as end user is having least amount of computerization.

4.32 Applications of E-commerce in the areas of pharmaceutical industry



4.12.6 Case processing summary

The following table shows the distribution figures of organizations providing customer valuable business information using e-commerce. The choice of very high has been selected by 25 organizations and their percentage is 30.5%.The choice of high has been selected by 28 organizations and their percentage is 34.1%. Average business information is provided by some organizations and their count is 11 and their percentage is 13.4%. In case of organizations providing low information are 16 in number and their percentage is 19.5%. Some organizations provide very low amount of information are very less 2 in number their percentage is 2.4%.

4.33 Case processing summary (Provide customer valuable business information)

Provide customer valuable business information	Count	Percent
very low	2	2.4%
low	16	19.5%
Average	11	13.4%
high	28	34.1%
very high	25	30.5%
Overall	82	100.0%
Excluded	0	
Total	82	

4.13 Applications of e-commerce in the areas of pharmaceutical industry

4.13.1 Ratio statistics for expanded customer base / increase visibility for search engine marketing

Price Related Differential is a measure of regressivity or progressivity. The value of it is 1.125 which is more than low group .995.For the average group it is the highest with value equal to 1.408 showing high progressivity while for high and very high group the value decreases to 1.032 and 1.124 showing less progressivity for this groups.

Coefficient of dispersion it is a measure used to quantify whether a set of observed occurrences are clustered or dispersed compared to a standard statistical model. For the low use group the value is .333 which is more compared to low use group which is 0.094 showing that the dispersion of values is more as compared to low group. For the average group the value is .648 which is high in comparison to low and very low group showing more dispersed values. For the high and very high group the value of dispersion coefficient is .223 and .235 which is again less compared to the remaining group except average group which is having very high value.

The coefficient of variation allows you to determine how much volatility (risk) you are assuming in comparison to the amount of return you can expect from your investment. In simple language, the lower the ratio of standard deviation to

mean return; the better your risk-return tradeoff. It is seen from the table that for ***very low*** application for expanded customer base and increase visibility through search engine marketing coefficient of variation is 47.1%. This means that there is a risk of 47.1% i.e there is more risk for very low application of expanded customer base / increase visibility through search engine marketing. For ***low*** application of **expanded customer base / Increase visibility through search engine marketing** coefficient of variation is 17.5 that the risk is less as compared to very low application. For average application group the risk is 109% which is very high. While for high and very high application the risk is 35.9% and 40.6% which is less compared to average application but is more than low application.

4.34 Ratio Statistics for Expanded customer base / Increase visibility through search engine marketing

Group	Price Related Differential	Coefficient of Dispersion	Coefficient of variation Median Centered
very low	1.125	.333	47.1%
low	.995	.094	17.5%
Average	1.408	.648	109.2%
high	1.057	.223	35.9%
very high	1.032	.235	40.6%
Overall	1.124	.349	74.2%

4.13.2 **Available 24/7/365 never close**

The following table gives the frequency distribution and percentage of all the organizations which are available for 24/7/365, never close. Organizations which are available for 24/7/365 are many with frequency count equal to 35 and their percentage is 42.7%. Some organizations with high frequency are 31 in number and their percentage is 37.8%. Organizations having average frequency (7) are having percentage equal to 8.5%. Organizations with low and

very low frequency are having percentage equal to 1.2% and their frequency is 1.

4.35 Available 24/7/365 never close

Available 24/7/365	Frequency	Percent
very low	1	1.2
low	7	8.5
Average	7	8.5
high	31	37.8
very high	35	42.7
6	1	1.2
Total	82	100.0

4.13.3 Provide customer valuable Information

The following table gives the frequency and percentage of e-commerce where e-commerce provides customers valuable information for different pharmaceutical companies. It is seen that ***very high*** rate for providing customer valuable information is seen for 31 companies (frequency – 31) and their percentage is 37.8 whereas ***high*** rate for providing customer valuable information is seen for 20 companies (frequency – 20) and their percentage is 24.4.Some pharmaceutical companies are getting ***average*** customer valuable information and they are 17 in number and their percentage is 20.7.whereas companies getting ***low*** and ***very low*** customer valuable information are 11 and 2 in number and their percentage is 13.4 and 2.4. It is clear from the above information that e-commerce provides customer valuable information in the large extent to the different pharmaceutical industries.

4.36 Provide customer valuable Information

Provide customer valuable information	Frequency	Percent
very low	2	2.4
low	11	13.4
Average	17	20.7
high	20	24.4
very high	31	37.8
43	1	1.2
Total	82	100.0

4.13.4 Build customer loyalty

Customer loyalty has been built by some organizations using e-commerce. 25.6% organizations have built very high customer loyalty are 21 in number. 29.3% organizations which have built high frequency are 24 in number. Average organizations have maximum frequency and are 26 in number and their percentage is 31.7%. Fewer organizations have built less customer loyalty with and their percentage is 4.9%. Less organizations have very less frequency equal to 7 i.e. very few organizations build very low customer loyalty.

4.37 Build Customer Loyalty

Build customer loyalty	Frequency	Percent
very low	4	4.9
low	7	8.5
Avg	26	31.7
high	24	29.3
very high	21	25.6
Total	82	100.0

4.13.5 Reduction of marketing and advertising cost

The following table gives the frequency distribution of organizations which are benefited by e-commerce in reduction and advertising cost. The organizations having very high benefit of reduction of marketing and advertising cost are having frequency equal to 32 and their percentage is 32.9%. High reduction marketing and advertising cost is obtained by 22 organizations and their percentage is 26.8%. Organizations with low reduction in marketing and advertising cost are with frequency equal to 10 and their percentage is 12.2%. Organizations with very low frequency in reduction in marketing and advertising cost are having percent equal to 1.2%.

4.38 Reduction of marketing and advertising cost

Reduction of marketing and advertising cost	Frequency	Percent
very low	1	1.2
low	10	12.2
Average	22	26.8
high	22	26.8
very high	27	32.9
Total	82	100.0

4.13.6 Collection of customer data

T-Test

4.39 Collection of customer data

Rating	Frequency	Percent
Very Low	5	6.1
Low	5	6.1
Average	26	31.7
High	23	28.0
Very high	23	28.0
Total	82	100.0

It is seen from the above table that very low rating is given by 5 companies and their percentage is 6.1 showing that they are least benefited by e-commerce. Low rating is given by 5 pharmaceutical companies and their percent is 6.1 indicating that they are less also less benefited but are benefited better than very low rating companies. 26 companies are benefited on an average by e-commerce and their percentage is 31.7. 23 e-commerce companies are highly benefited and their percentage is 28. Rest 23 companies out of total 82 are very highly benefited and their percentage is 28. Hence it is seen that most of the companies are benefited by e-commerce in terms of collection of data.

4.14 E-commerce helps in the process of implementation

4.14.1 Chi square test and test statistics for Process of implementation

The following table shows observed and the expected values for the test whether e-commerce helps in process of implementation Observed values for the companies in which it was seen that e-commerce does not help in the process of implementation is 23 against the expected value 41. The Observed values for the companies in which it was seen that e-commerce helps in the

process of implementation is 59 against the expected value 41. The difference between the expected and the observed values is 18.

4.40 Chi-Square Test

e-commerce help in process implementation

	Observed N	Expected N	Residual
No	23	41.0	-18.0
Yes	59	41.0	18.0
Total	82		

The chi square test was carried out for the process of implementation. Its value is 15.805

4.41 Test Statistics

	e-commerce help in process implementation
Chi-Square	15.805[a]
df	1
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 41.0.

4.14.2 Cross tabulation values of type of software use to e-commerce helps in process of implementation

- The table shows that when commercial software is not used for daily operation e-commerce does not help in the process of implementation in one company while in no company e-commerce helps in process of implementation when the use of commercial software is not done.
- The table shows that when desktop software is not used for daily operation e-commerce does not help in the process of implementation in one company while in no company e-commerce helps in process of implementation when the use of desktop software is not done.
- The table shows that when standard pharmaceutical software is not used for daily operation e-commerce does not help in the process of implementation in any company while in three companies e-commerce helps in process of implementation when the use of standard pharmaceutical software is not done.
- The table shows that when ERP software is not used for daily operation e-

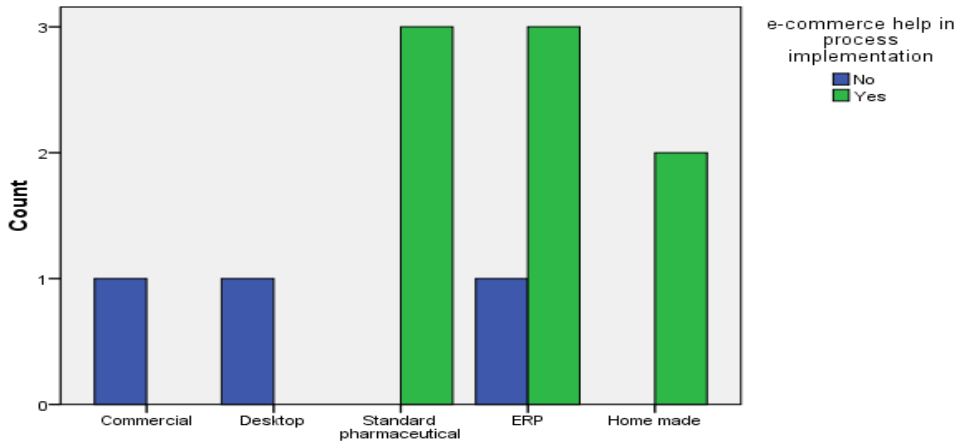
commerce does not help in the process of implementation in one company while in three companies e-commerce helps in process of implementation when the use of ERP software is not done.

- The table shows that when home made software is not used for daily operation e-commerce does not help in the process of implementation in no company while in two companies e-commerce helps in process of implementation when the use of home made software is not done.
- The table shows that when all the above software are not used for daily operation e-commerce does not help in the process of implementation in three companies while in eight companies e-commerce helps in process of implementation when the use of all the above software are not done.

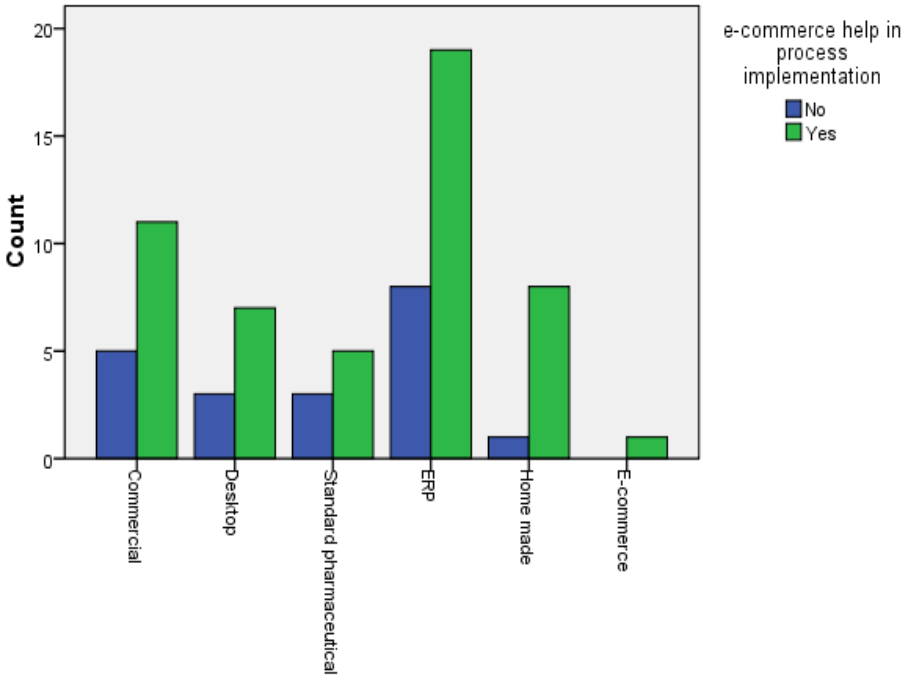
4.42 Type of Software use to execute your daily operation Vs e-commerce help in process implementation

e-commerce help in process implementation			e-commerce helps in process of implementation	
			No	Yes
No	Type of Software use to execute your daily operation	Commercial	1	0
		Desktop	1	0
		Standard pharmaceutical	0	3
		ERP	1	3
		Home made	0	2
		Total	3	8
Yes	Type of Software use to execute your daily operation	Commercial	5	11
		Desktop	3	7
		Standard pharmaceutical	3	5
		ERP	8	19
		Home made	1	8
		E-commerce	0	1
		Total	20	51

4.22 E-commerce helps in process of implementation -No



4.23 E-commerce helps in process of implementation - Yes



4.14.3 The following table shows when different software are not used how many companies are affected in the process of implementation.

- When ***commercial*** software is not used ***one*** company may be affected in the process of implementation.
- When ***desktop*** software is not used ***one*** company out of 82 may be affected in the process of implementation.
- When ***standard pharmaceutical*** software is not used ***three*** companies out of 82 may be affected in the process of implementation.
- When ***ERP*** software is not used ***four*** companies out of 82 may be affected in the process of implementation.

- When ***home made*** software is not used ***two*** companies out of 82 may be affected in the process of implementation.
- When all above mentioned software are not used ***eleven*** companies out of 82 may be affected in the process of implementation.

  The following table shows when different software are used how many companies are affected in the process of implementation.
- When ***commercial*** software is used ***sixteen*** companies may be affected in the process of implementation.
- When ***desktop*** software is used ***ten*** companies may be affected in the process of implementation.
- When ***standard pharmaceutical*** software is used ***eight*** companies may be affected in the process of implementation.
- When ***ERP*** software is used twenty ***seven*** companies may be affected in the process of implementation.
- When ***home made*** software is used ***nine*** companies may be affected in the process of implementation.
- When ***e-commerce*** software is used ***one*** company may be affected in the process of implementation.
- When all the above softwares are used ***seventy one*** companies may be affected in the process of implementation.

4.43 Type of Software use and e-commerce help in process implementation

e-commerce help in process implementation	Type of Software use to execute your daily operation	Total
No	Commercial	1
	Desktop	1
	Standard pharmaceutical	3
	ERP	4
	Home made	2
	Total	**11**
Yes	Commercial	16
	Desktop	10
	Standard pharmaceutical	8
	ERP	27
	Home made	9
	E-commerce	1
	Total	**71**

4.15 Factors influencing e-commerce development in pharmaceutical industry

4.15.1 Correlations between all the factors influencing e-commerce and telecomm infrastructure, government regulations and related supporting industries

In the following table correlation of telecomm infrastructure with related

supporting industries is .354. It shows that correlation is significant at ***0.01 level***

4.44 Factors influencing e-commerce development in pharmaceutical industry Correlations with themselves-I

Influencing Factors	Correlations	Telecomm Infrastructure	Government regulations	Related & supporting industries
Telecomm Infrastructure	Pearson	1	.203	.354**
	Sig. (2-tailed)		.067	.001
	N	82	82	82
Government regulations	Pearson	.203	1	.188
	Sig. (2-tailed)	.067		.091
	N	82	82	82
Related & supporting industries	Pearson	.354**	.188	1
	Sig. (2-tailed)	.001	.091	
	N	82	82	82
logistic systems	Pearson	.113	.127	.402**
	Sig. (2-tailed)	.310	.254	.000
	N	82	82	82
Managing & organizing	Pearson	-.214	.260*	.130
	Sig. (2-tailed)	.053	.018	.244
	N	82	82	82
E-commerce	Pearson	.215	.285**	.496**
	Sig. (2-tailed)	.053	.010	.000
	N	82	82	82
consumer demand e-commerce	Pearson Correlation	.363**	.185	.382**
	Sig. (2-tailed)	.001	.096	.000
	N	82	82	82
business demand for e-commerce	Pearson Correlation	.013	.046	.281*
	Sig. (2-tailed)	.911	.681	.011
	N	82	82	82

****. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).**

Correlation of related and supporting industries with telecomm infrastructure is .354. It shows that correlation is significant at ***0.01 level.*** Correlation of logistic

system with related and supporting industries is significant at 0.01 level with the value equal to .402. Correlation of managing and organizing with government regulations is significant at 0.05 level with the value equal to .260. Correlation of e-commerce with government regulations and related and supporting industries is significant at 0.01 level with the values equal to .285 and 496. Correlation of consumer demand e-commerce with telecomm infrastructure and related and supporting industries is significant at 0.01 level with the value equal to .363 and .382 respectively. Correlation of business demand for e-commerce with related and supporting industries is significant at 0.05 level with the value equal to 281.

4.15.2 Correlation between all factors influencing e-commerce with logistic system, managing and reorganizing and e-commerce

In the following table correlation of government regulations with managing and organizing is .260. It shows that correlation is significant at ***0.05 level.*** Correlation of government regulations with e-commerce is .285. This shows that the correlation is significant at ***0.01 level.*** Correlation of related supporting industries with logistic system and e-commerce is significant at 0.01 level with the values equal to .402 and 496. Correlation of logistic system with managing and organizing and e-commerce is significant at 0.01 level with the values equal to .337 and 618. Correlation of consumer demand e-commerce with logistic system is significant at 0.05 level with the value equal to .239 while Correlation of consumer demand e-commerce with e-commerce is significant at .01 level with the value equal to .497. Correlation of business demand e-commerce with logistic system and e-commerce is significant at the 0.01level with the values equal to .314 and .380 respectively.

4.45 Factors influencing e-commerce development in the pharmaceutical industry Correlations with themselv

		logistic systems	Managing & organizing	E-commerce
Telecomm Infrastructure	Pearson Correlation	.113	-.214	.215
	Sig. (2-tailed)	.310	.053	.053
	N	82	82	82
Government regulations	Pearson Correlation	.127	.260*	.285**
	Sig. (2-tailed)	.254		.010
	N	82	82	82
Related & supporting industries	Pearson Correlation	.402**	.130	.496**
	Sig. (2-tailed)	.000	.244	.000
	N	82	82	82
logistic systems	Pearson Correlation	1	.337**	.618**
	Sig. (2-tailed)		.002	.000
	N	82	82	82
Managing & organizing	Pearson Correlation	.337**	1	.393**
	Sig. (2-tailed)	.002		.000
	N	82	82	82
E-commerce	Pearson Correlation	.618**	.393**	1
	Sig. (2-tailed)	.000	.000	
	N	82	82	82
consumer demand e-commerce	Pearson Correlation	.239*	.000	.497**
	Sig. (2-tailed)	.031	.999	.000
	N	82	82	82
business demand for e-commerce	Pearson Correlation	.314**	.184	.380**
	Sig. (2-tailed)	.004	.098	.000
	N	82	82	82

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

4.15.3 Correlation between all the factors influencing e-commerce with consumer demand e-commerce and business demand e-commerce

4.46 Correlation between all the factors influencing e-commerce with consumer demand e-commerce and business demand e-commerce

Factors Influencing e-commerce	Type of correlation	consumer demand e-commerce	business demand for e-commerce
Telecomm Infrastructure	Pearson Correlation	.363**	.013
	Sig. (2-tailed)	.001	.911
	N	82	82
Government regulations	Pearson Correlation	.185	.046
	Sig. (2-tailed)	.096	.681
	N	82	82
Related & supporting industries	Pearson Correlation	.382**	.281*
	Sig. (2-tailed)	.000	.011
	N	82	82
logistic systems	Pearson Correlation	.239*	.314**
	Sig. (2-tailed)	.031	.004
	N	82	82
Managing & organizing	Pearson Correlation	.000	.184
	Sig. (2-tailed)	.999	.098
	N	82	82
E-commerce	Pearson Correlation	.497**	.380**
	Sig. (2-tailed)	.000	.000
	N	82	82
consumer demand e-commerce	Pearson Correlation	1	.475**
	Sig. (2-tailed)		.000
	N	82	82
business demand for e-commerce	Pearson Correlation	.475**	1
	Sig. (2-tailed)	.000	
	N	82	82

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

shows weak positive and 0.01 level signed 2-tailed correlation for the sample of 82 pharmaceutical companies.

In the fifth row managing and organizing is related with consumer demand e-

commerce the value of it is 0 showing no correlation between them. Managing and organizing is related with business demand e-commerce showing value equal to .184 showing ***weak positive correlation.***

In the sixth row e-commerce is related with consumer demand e-commerce the value of it is 0.497 showing ***moderate positive correlation*** between them. Where as e-commerce is related with business demand e-commerce and its value is .380 which shows ***0.01 level significant 2 tailed and weak positive correlation.***

In the seventh row consumer demand e-commerce is related with consumer demand e-commerce the value of it is 1 showing ***perfect positive correlation*** between them. Where as e-commerce is related with business demand e-commerce and its value is .475 which shows ***0.01 level significant 2 tailed correlation and moderate positive correlation.***

In the eighth row business demand e-commerce is related with consumer demand e-commerce the value of it is .475 showing ***moderate positive correlation*** and 0.01 level 2 tailed correlation between them. Where as e-commerce is related with business demand e-commerce and its value is 1 which shows ***perfect positive correlation.***

4.16 The processes involved in e-commerce of the pharmaceutical industry

The following table (4.16) gives the distribution of frequencies of the processes involved in e-commerce of the pharmaceutical industry. The major process involved of e-commerce is B2B with frequency equal to 39. Second process involved is B2C which is having frequency 25. That means that process B2B is used more than B2C. These two processes are mainly used in the pharmaceutical industry.

In some pharmaceutical companies B2C and B2B processes are used, the percentage of these companies is 4.9 and they are 4 in number out of total 82 companies which use e-commerce. Some companies are using B2C and C2B processes but their percentage is only 1.2 and there is only one company out of 82 companies which use e-commerce. There is only one company out of

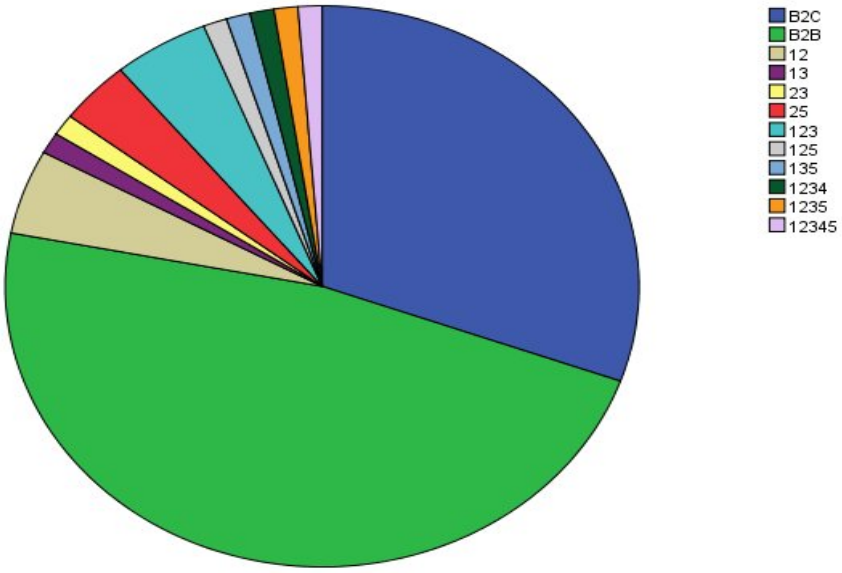
82 e-commerce using companies which is using B2B and C2B processes and the percentage of companies using these processes is very less, 1.2.Some companies (3 out of 82 e-commerce companies) use B2B and B2G processes and their percentage is 3.7.

Some companies are using three processes B2C, B2B and C2B (4 out of 82 e-commerce companies) and their percentage is 4.9.Some companies (3 out of 82 e-commerce companies) use B2C, B2B and B2G processes and their percentage is 3.7. Some companies (1 out of 82 e-commerce companies) use B2C, C2B and B2G processes and their percentage is 1.2. One company (1 out of 82 e-commerce companies) uses B2C, B2B, C2B and C2C processes and their percentage is 1.2. One company (1 out of 82 e-commerce companies) uses B2C, B2B, C2B and B2G processes and their percentage is 1.2. One company (1 out of 82 e-commerce companies) uses B2C, B2B, C2B, C2C and B2G processes and their percentage is 1.2.

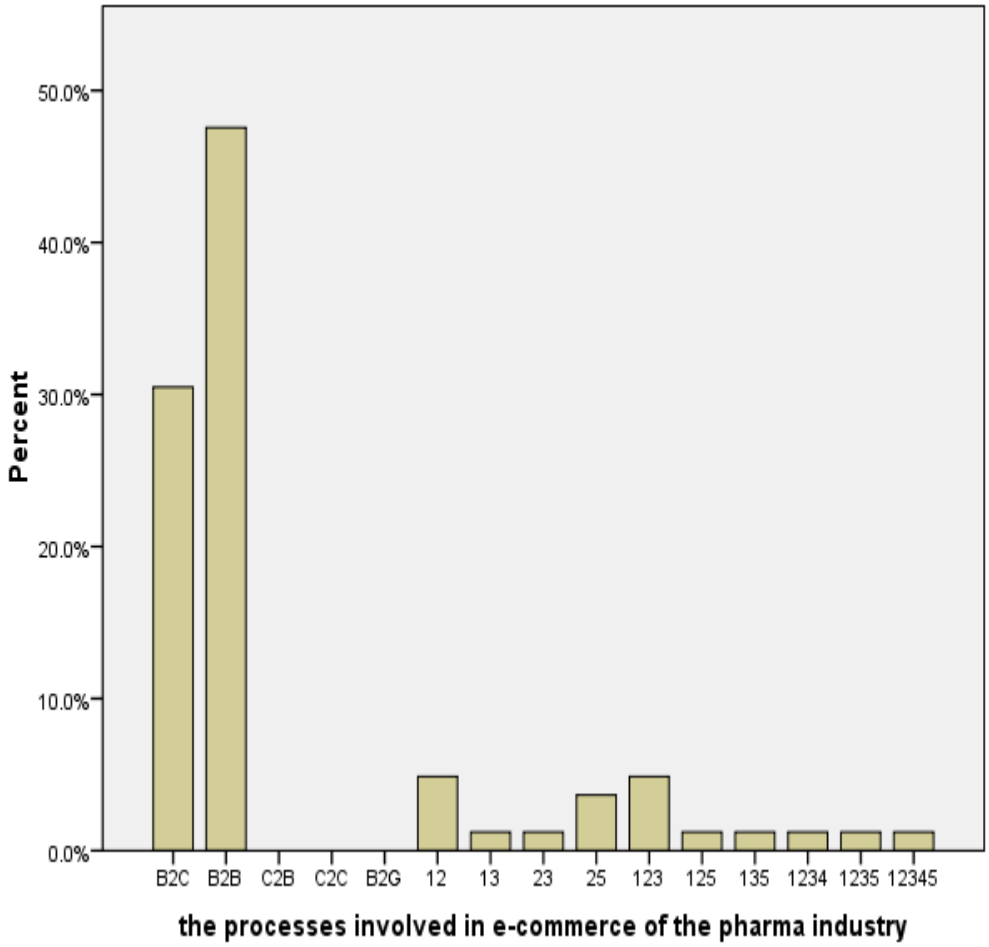
4.47 **Processes involved in e-commerce of the pharmaceutical industry**

Processes Used	Frequency	Percent	Valid Percent	Cumulative Percent
B2C	25	30.5	30.5	30.5
B2B	39	47.6	47.6	78.0
B2C, B2B	4	4.9	4.9	82.9
B2C,C2B	1	1.2	1.2	84.1
B2B,C2B	1	1.2	1.2	85.4
B2B,B2G	3	3.7	3.7	89.0
B2C,B2B,C2B	4	4.9	4.9	93.9
B2C,B2B,B2G	1	1.2	1.2	95.1
B2C,C2B,B2G	1	1.2	1.2	96.3
B2C,B2B,C2B,C2C	1	1.2	1.2	97.6
B2C,B2B,C2B,B2G	1	1.2	1.2	98.8
B2C,B2B,C2B,C2C B2G	1	1.2	1.2	100.0
Total	82	100.0	100.0	

4.24 The processes involved in e-commerce of the pharmaceutical Industry-I



4.25 Processes involved of e-commerce in the pharmaceutical industry-II



4.17 Technology more suitable for e-commerce in pharmaceutical industry

This table gives the distribution of software which will be used in pharmaceutical industry. The presentation software user interface tier is the main software which is used maximum with frequency equal to 49 i.e. 49 companies use presentation services tier with these (Javascript / HTML / XML / Borland C++/ Java) software. Middleware business objects tier is having comparatively less frequency equal to 14.this means that 14 companies use middleware business objects tier with (.Net, OBBC, ASP, OLE/DB, COM+, DCOM etc) software.

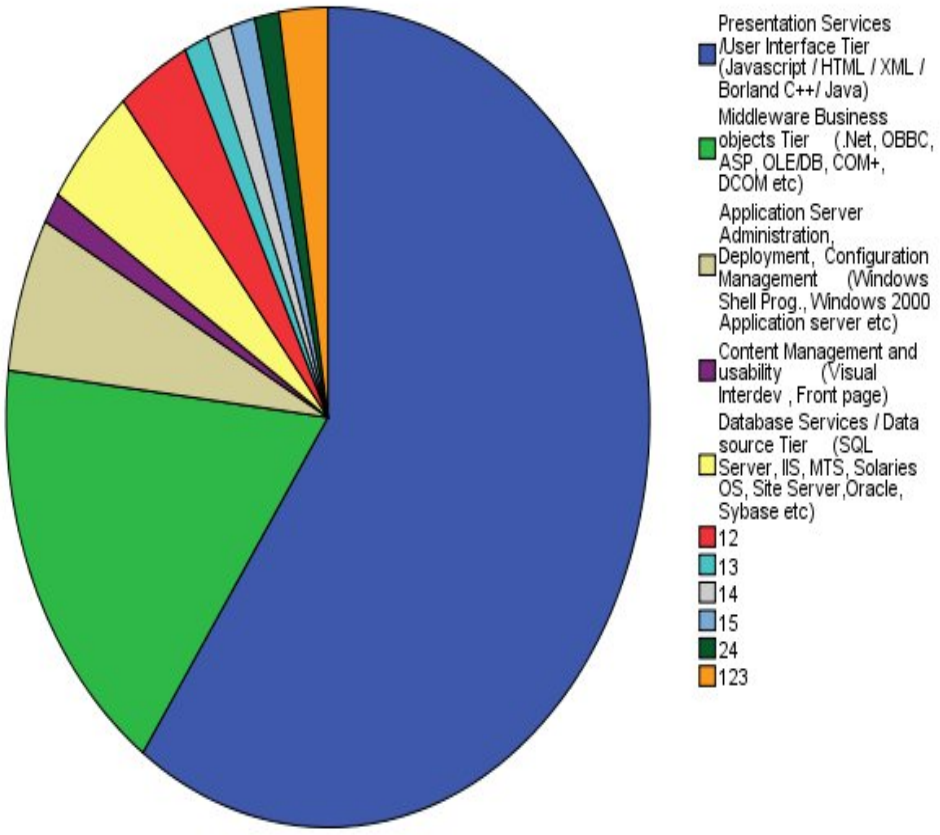
4.48 Technology more suitable for e-commerce in pharmaceutical industry

Technology	Frequency	Percent	Valid Percent	Cumulative Percent
Presentation Services /User Interface Tier	49	59.8	59.8	59.8
Middleware Business objects Tier	14	17.1	17.1	76.8
Application Server Administration, Deployment, Configuration Management	5	6.1	6.1	82.9
Content Management and usability	1	1.2	1.2	84.1
Database Services / Data source Tier	4	4.9	4.9	89.0
12	3	3.7	3.7	92.7
13	1	1.2	1.2	93.9
14	1	1.2	1.2	95.1
15	1	1.2	1.2	96.3
24	1	1.2	1.2	97.6
123	2	2.4	2.4	100.0
Total	82	100.0	100.0	

Where 1- Presentation Services /User Interface Tier (Javascript / HTML / XML /Borland C++/ Java)
2- Middleware Business objects Tier (.Net, OBBC, ASP, OLE/DB, COM+, DCOM etc)
3- Application Server Administration, Deployment, Configuration Management (Windows Shell Prog., Windows 2000 Application server etc)
4- Content Management and usability (Visual Interdev, Front page)
5- Database Services / Data source Tier (SQL Server, IIS, MTS, Solaries OS, Site Server, Oracle, Sybase etc)

There are 5 pharmaceutical companies which use Application server administration, Deployment, configuration management tier with (Windows shell programming, Windows 2000 Application server etc. Content management and usability tier is used by only one company out of total 82 companies with (Visual Interdev and Front page software. Database services / Data source Tier with (SQL server / IIS, MTS, Solaris OS, Site server Oracle Sybase etc.) software are used by 4 companies out of 82.There are some pharmaceutical companies which use more than one type of tiers. Out of which companies using presentation services tier and middleware business objects tier are 3 in number and their percentage is 3.7.Companies using presentation services tier and Application Server Administration, Deployment, Configuration Management tier is only one in number out of total 82 and the percentage is 1.2.

4.26 E-commerce Technology suitable for pharmaceutical Industry



Presentation services tier and Content Management and usability tier are used by only one pharmaceutical company out of 82 companies and the percentage is 1.2. Presentation services tier and (database Services / data source) Tier are used by only one company out of 82 and its percentage is 1.2. Middleware Business objects Tier and Content Management and usability are used by only one pharmaceutical company out of 82 companies and the percentage is 1.2. Presentation services tier, Middleware Business objects Tier and Application Server Administration, Deployment, Configuration Management are used by only two pharmaceutical companies out of 82 companies and the percentage is 2.4 with the given software.

4.18 Way e-commerce saves the cost of any pharmaceutical industry

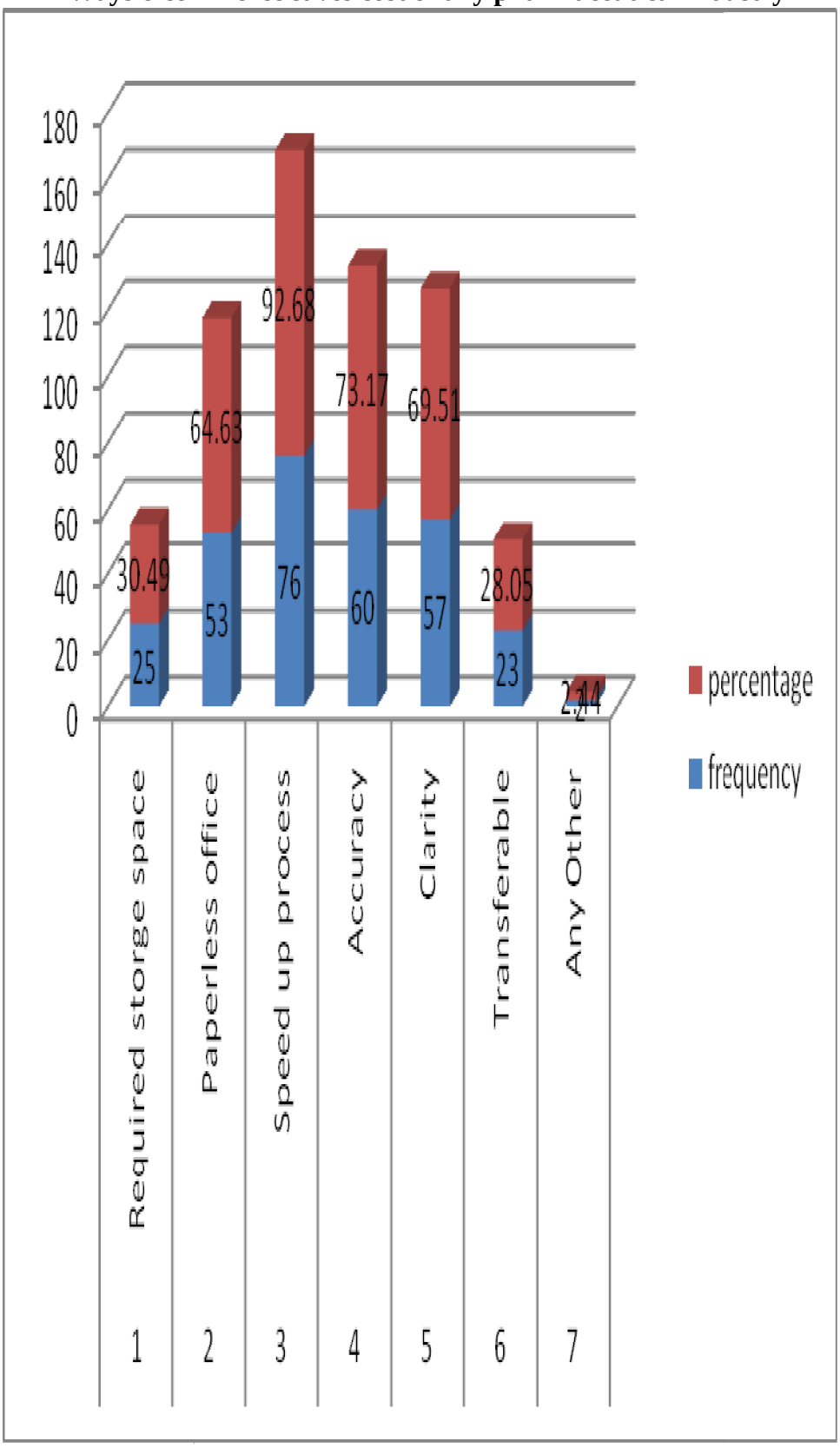
The following table shows the frequency and percent values for the factors for which e-commerce saves cost in the industry.

1) ***Required storage space*** **-** It is seen from the table 4.55 that the frequency for this is 25 i.e. 25 companies are benefited by this factor for the cost and their percentage is 30.49%. It shows that required storage space is saved in 30.49% companies showing that e-commerce saves cost by this factor.
2) **Paperless office** – The frequency and percentage of the paperless office is 53 and 64.63% as seen from the table (4.55) which is good enough to say that e-commerce saves cost by the factor paperless office.
3) ***Speed up the process*** – The frequency for this is 76 and percentage is 92.68% as seen from the table 4.55. This shows that almost all the companies are getting the benefit of speeding up processes. As the processes speed up the cost of the company is saved. This proves that e-commerce saves cost by speeding up the processes.
4) ***Accuracy*** – For accuracy the frequency is 60 i.e. 60 companies are getting the benefit of e-commerce in accuracy. The percentage for accuracy is 73.17%. This shows that e-commerce helps in saving cost by accuracy in pharmaceutical industry. This proves that e-commerce saves cost by accuracy of processes in the pharmaceutical industry.
5) ***Clarity*** – For clarity the frequency is 57 i.e. 69.51 companies are getting the benefit of e-commerce in clarity. The percentage for clarity is 69.51%. This

4.55 ways e-commerce saves cost of any pharmaceutical industry

Cost saving factor	Frequency	Percent
Required storage space	25	30.49
Paperless office	53	64.63
Speed up process	76	92.68
Accuracy	60	73.17
Clarity	57	69.51
Transferable	23	28.05
Total	82	

Ways e-commerce saves cost of any pharmaceutical industry



shows that e-commerce helps in saving cost by clarity in pharmaceutical industry. This proves that e-commerce saves cost by clarity of processes in the pharmaceutical industry.

6) Transferable – For transferable the frequency is 23 i.e. 23 companies are getting the benefit of e-commerce in transferable. The percentage for transferable is 73.17%. This shows that e-commerce helps in saving cost by transferable factor in pharmaceutical industry. This proves that e-commerce saves cost by transferability of processes in the pharmaceutical industry.

As seen from the above figures e-commerce helps in cost benefit for the above mentioned factors, required storage space, paperless office, speed up process, accuracy, clarity and transferable factors.

4.18.1 Correlations of type of technology with type of software

The following table shows the correlation between the technology more suitable for the pharmaceutical industry and type of software use to execute your daily operation. The relation of technology more suitable for pharmaceutical industry with itself is having value 1. It means that there is ***perfect positive correlation*** between them. The relation of technology more suitable for e-commerce in pharmaceutical industry with type of software use to execute your daily operation is having a negative value -.126 showing ***weak negative correlation*** between the two from the sample of 82 pharmaceutical companies. Also there is significant level 2 tailed correlation with the technology more suitable for the pharmaceutical industry and type of software use to execute your daily operation with the value equal to .259.

The relation of type of software use to execute your daily operation and the technology more suitable for the pharmaceutical industry is having a

negative value -.126 showing ***weak negative correlation*** between the two from the sample of 82 pharmaceutical companies. The relation of technology more suitable for pharmaceutical industry with itself is having value 1. It means that there is ***perfect positive correlation*** between them.

4.50 Correlations of type of technology with type of software

Technology/Type of software	Type of correlation	technology more suitable for e-commerce in pharmaceutical industry	Type of Software use to execute your daily operation
technology is more suitable for e-commerce in pharmaceutical industry	Pearson	1	-.126
	Sig. (2-tailed)		.259
	N	82	82
Type of Software use to execute your daily operation	Pearson	-.126	1
	Sig. (2-tailed)	.259	
	N	82	82

4.19 Payment system used in different pharmaceutical organizations

The following table shows the frequency distribution of payment system used by the organizations. Cheque payment system is used maximum with the frequency equal to 25. Next to that is the use of B2B payment system with the frequency equal to 23. Next to this is a credit card system which is used with the frequency 8. Online stored value system is having frequency 6 and is next to credit card system in use. Digital cash is next to it with the frequency equal to 5. Some companies are using two systems with the frequency of 1,2 and 3. The companies with frequency equal to 3 are using online stored value system and B2B payment system. The companies having frequency equal to 2 use following combinations of payment systems. -

1) Credit card and online stored value system
2) Credit card and B2B payment system
3) Digital cash and B2B payment system
4) Digital cash and cheque payment

This shows that there is only one organization each using all the above type of

combinations of payment systems and their percent is negligible.

Systems with frequency 1 are using following combinations of payment systems. -

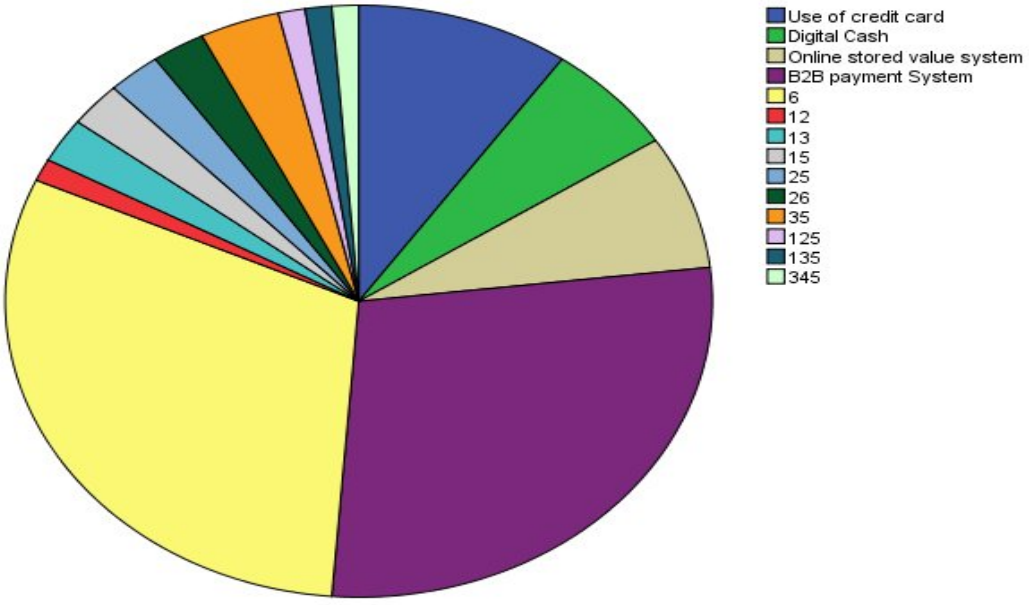
1) Credit card and digital cash
2) Credit card, digital cash and B2B payment system
3) Credit card, online stored value system and B2B payment system
4) Online stored value system, stored value system and B2B payment system

This shows that there is only one organization each using all the above type of combinations of payment systems and their percent is negligible.

4.51 Payment system used in the pharmaceutical industry

Payment systems used	Frequency	Percent
Use of credit card	8	9.8
Digital Cash	5	6.1
Online stored value system	6	7.3
B2B payment System	23	28.0
Cheque payment	25	30.5
Use of credit card , Digital Cash	1	1.2
Use of credit card, Online stored value system	2	2.4
Use of credit card, B2B payment system	2	2.4
Digital Cash, B2B payment system	2	2.4
Digital Cash, Cheque payment	2	2.4
Online stored value system, B2B payment System	3	3.7
Use of credit card, Digital Cash, B2B payment system	1	1.2
Use of credit card, Online stored value system, B2B payment system	1	1.2
Online stored value system, stored value system,B2B payment system	1	1.2
Total	82	100.0

4.27 Payment system used in pharmaceutical industry



4.20 The issues in E-commerce faced by the pharmaceutical industry

This table gives the frequency distribution of the issues in e-commerce faced by the pharmaceutical industry. Only 4 organizations out of 82 face the problem of security. Percentage of organizations facing this problem is 4.9 percent. Next to that are the problems of ***infrastructure*** faced by three organizations and their percentage is 3.7. Number of organizations facing ***computer literacy*** problem are 3 out of 82 organizations and their percentage is also 3.7. Where as Number of organizations facing ***resistance for changing to new technology*** problem are 3 out of 82 organizations and their percentage is also 3.7. Technological Barrier is faced by 2 companies out of 82companies and their percentage is 2.4 which are very less. ***Man power*** and any other type of issues are very less prominent as there is only one company facing only this problem.

Some pharmaceutical companies are facing more than one problem and they are as follows –

1) Technological barrier and Computer literacy faced by 4 companies with percent equal to 4.9.
2) Technological barrier and Resistance for changing to new technology faced by 3 companies and their percentage is equal to 3.7.

3) Technological barrier and security problems faced by 2 companies and their percentage is 2.4
4) Technological barrier and man power problems are faced by only one company and its percentage is 1.2.
5) Infrastructure and computer literacy problem is faced by 3 companies and its percentage is 3.7.
6) Infrastructure and resistance for changing to new technology are faced by only one company only and its percentage is 1.2.
7) Infrastructure and security problems are faced by only one company and their percentage is 1.2.
8) Infrastructure and man power problems are faced by only two companies with percentage equal to 2.4.
9) Computer literacy and resistance for changing to new technology are faced by only one company and its percentage is 1.2.
10) Computer literacy and security problems are faced by six companies are their percentage is 7.3.
11) Computer literacy and man power problems are faced by only one company and its percentage is 1.2.
12) Resistance for changing to new technology and security problems are faced by 3 companies and the percentage is 3.7.
13) Resistance for changing to new technology and man power are faced by 1 companies and the percentage is 1.2.
14) Technological barrier, infrastructure and computer literacy is faced by 5 companies and their percentage is 6.1.
15) Technological barrier, infrastructure and security problems are faced by 1 company and the percentage is 1.2.
16) Technological barrier, infrastructure and man power are faced by 1 company and the percentage is 1.2.
17) Technological barrier, computer literacy and security problems are faced by 1 company and the percentage is 1.2.
18) Technological barrier, computer literacy and man power are faced by 1 company and the percentage is 1.2.

19) Technological barrier, resistance for changing to new technology and security problems are faced by 5 companies and the percentage is 6.1.
20) Infrastructure, computer literacy and resistance for changing to new technology are faced by 1 company and the percentage is 1.2.
21) Infrastructure, computer literacy and security problems are faced by 3 companies and the percentage is 3.7.
22) Infrastructure, resistance for changing to new technology and security problems are faced by 1 company and the percentage is 1.2.
23) Computer literacy, resistance for changing to new technology and security problems are faced by 1 company and the percentage is 1.2.
24) Computer literacy, resistance for changing to new technology and man power problems are faced by 1 company and the percentage is 1.2.
25) Computer literacy, resistance for changing to new technology and man power problems are faced by 1 company and the percentage is 1.2.
26) Technological barrier, infrastructure, Computer literacy and resistance for changing to new technology are faced by one company and the percentage is 1.2.
27) Technological barrier, infrastructure, Computer literacy and man power are faced by one company and the percentage is 1.2.
28) Technological barrier, infrastructure, resistance for changing to new technology and security problems are faced by one company and the percentage is 1.2.
29) Technological barrier, infrastructure, security problems and man power are faced by 1 company and the percentage is 1.2.
30) Technological barrier, computer literacy, resistance for changing to new technology and security problems are faced by 2 companies and the percentage is 2.4.
31) Technological barrier, resistance for changing to new technology, man power and security problems are faced by 1 companies and the percentage is 1.2 .
32) Infrastructure, computer literacy, security problems and man power are faced by 1 companies and the percentage is 1.2.
33) Technological barrier, infrastructure, computer literacy, resistance for changing to new technology and security problems are faced by 3 companies and the **4.52**

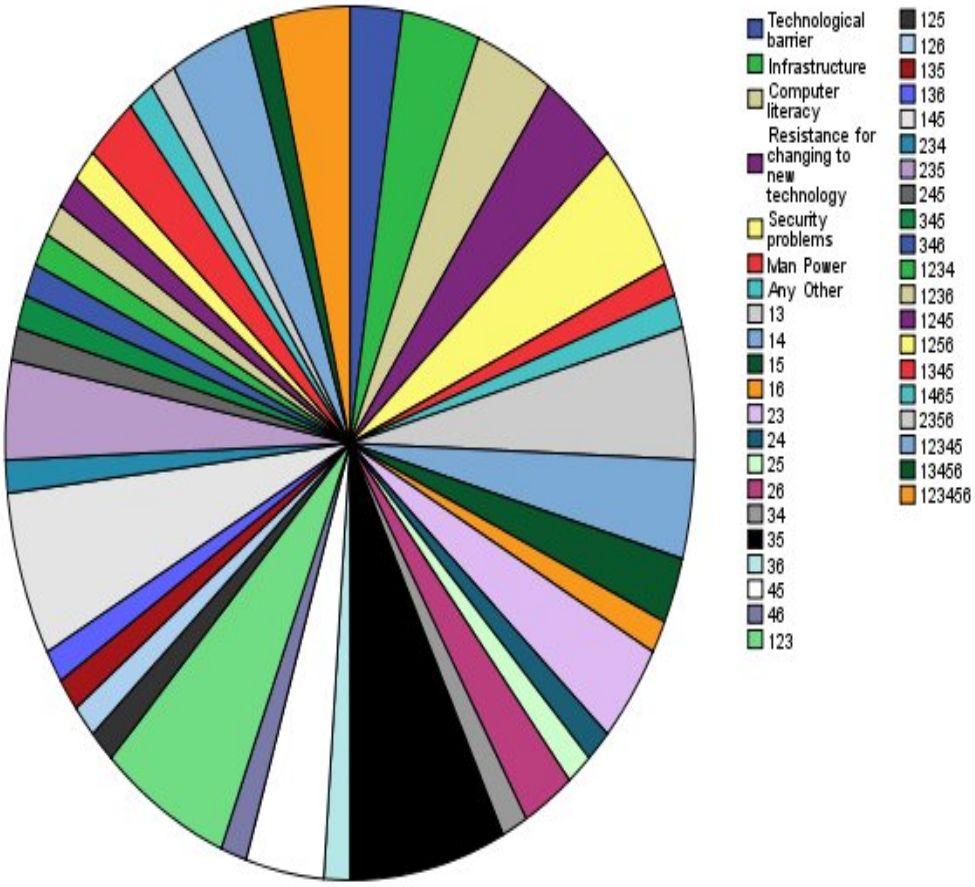
4.52 Issues in E-commerce faced by the pharmaceutical industry

Name of the issue	No of organizations	Percent
Technological barrier	2	2.4
Infrastructure	3	3.7
Computer literacy	3	3.7
Resistance for changing to new technology	3	3.7
Security problems	4	4.9
Man Power	1	1.2
Any Other	1	1.2
13	4	4.9
14	3	3.7
15	2	2.4
16	1	1.2
23	3	3.7
24	1	1.2
25	1	1.2
26	2	2.4
34	1	1.2
35	6	7.3
36	1	1.2
45	3	3.7
46	1	1.2
123	5	6.1
125	1	1.2
126	1	1.2
135	1	1.2
136	1	1.2
145	5	6.1
234	1	1.2
235	3	3.7
245	1	1.2
345	1	1.2
346	1	1.2

Name of the issue	No of organizations	Percent
1234	1	1.2
1236	1	1.2
1245	1	1.2
1256	1	1.2
1345	2	2.4
1465	1	1.2
2356	1	1.2
12345	3	3.7
13456	1	1.2
123456	3	3.7
Total	82	100.0

Where 1-Tecnological barrier, 2–Infrastructure, 3-computer literacy, 4- Resistance for changing to new technology 5-Security problems, 6-Man power

4.28 Issues in e-commerce faced by pharmaceutical Industry



percentage is 3.7.

34) Technological barrier, computer literacy, resistance for changing to new technology, security problems and man power are faced by 1 company and the percentage is 1.2.

35) Technological barrier, infrastructure, computer literacy, resistance for changing to new technology, security problems and man power are faced by 3 companies and the percentage is 3.7.

4.21 Testing of Hypotheses

The method of testing the hypotheses is described in chapter 2 under Needs and importance of study before. If there is majority of the respondents then that hypotheses is considered confirmed or accepted. If there is 5% significance when the T-test is applied to a hypothesis then that test is considered as accepted or confirmed otherwise it will be considered as rejected. The data obtained from the survey will be used as a primary data for this hypothesis. Conclusions obtained from the primary and secondary data will also be used for proving the hypotheses.

The following hypotheses have been tested based on the obtained data –

1. E-commerce enhances the process of manufacturing and sales and speeds up the processes of the industry.
2. Most of the pharmaceutical industries use e-commerce
3. Manual and paper based systems are replaced with supply chain management system for purpose of cost benefit.

4.21.1 The first hypotheses is ***"E-commerce enhances the process of marketing and sales and speeds up the processes of the industry."***

This hypothesis has been tested based on the primary data collected by using questionnaire, interviews with the company employees and the observations at the time of visiting the company. The data is also obtained from the discussions with the concerned people. From the questionnaire data table no. 4.22 it is seen that use of the e-commerce is very high in marketing and sales. Its frequency is very high and is equal to 71 (out of total 90 companies) and percentage of usage is 78.89 percent. This proves that most of the pharmaceutical industries have adopted e-commerce for speeding up processes of marketing and sales. It is also

a known fact that internet has made the data processing very fast. So without any time lag the data is transferred from one place to another. This hypothesis is therefore confirmed.

Statistically this hypothesis can be tested as follows-

Step 1: Setting Hypothesis

H0 Null Hypothesis: In 79% or more companies e-commerce enhances the process of marketing and sales and speeds up the process of the industry. (H0: p= .79)

H1 Alternate hypothesis: Less than (<) 79% or more companies e-commerce enhances the process of marketing and sales and speeds up the processes of the industry.(H1: p < 79)

Step II : Sample Size

n = 90 (>30)

As n>30, large sample size. Hence Chi square test is used.

4.22 Use of e-commerce for different purposes in pharmaceutical industry

Purpose	**Frequency**	**Percentage of companies using for diff. purposes with total (90)companies =Freq/90*100**	**Percent use for diff. purposes with total use =Freq/177*100**
1)) Marketing and sales	71	78.89	40.11
2) Manufacturing	11	12.22	06.21
3) Advertising	22	24.45	12.42
4) Human Resource	16	17.78	09.03
5) Research	18	20.00	10.16
6) Any other than this	39	43.33	22.03

Step III: Calculation of S.E. (Standard error)

S.E = $\sqrt{}$(pq / n) where p = 79

q= 10

n= 90

S.E = $\sqrt{}$(79* 10/90)

= 2.9627

Step IV : Calculation of degree of freedom

= Chi-square Value = 1 as given by the following table

4.41 Test Statistics

	e-commerce help in process implementation
Chi-Square	15.805[a]
df	1
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 41.0.

= Degree of freedom = (c-1) *(r-1) = (3 -1) * (6-1) = 10

Table value at 6 degree of freedom is 2.9627 at the 5% level of significance

Step V: Conclusion

Calculated value of X^2 (2.9627) > Table value (1) at the 5% level of significance and hence we reject H1. Hence the hypothesis ***"E-commerce enhances the process of marketing and sales and speeds up the processes of the industry."*** is accepted.

Summary: This hypothesis "E-commerce enhances processes of marketing and sales and speeds up the processes of the industry" is proved by two methods. 1) Statistically as the calculated value of standard error is greater than table value which is one at 5% level of significance, this hypothesis is proved. 2) By majority method also. As 71 companies out of 90 (79%) use e-commerce for marketing and sales this hypothesis is proved by majority use by different pharmaceutical industries. Hence this hypothesis is accepted

4.21.2 Hypothesis 2: *"Most of the pharmaceutical companies use e-commerce"*

This hypothesis is proved by two methods –

1) By majority:

It is seen from the table 4.20 (given below) that 92.22 percent companies use e-commerce while only 7.77 companies do not use e-commerce. Also during the survey it was seen that most of the pharmaceutical companies have computerized offices and they use internet. Most of (other than very small) companies are

having their own website. But the marketing is not done directly to the patients but to the doctors and it is done by medical representatives only. Medical representatives use e-commerce for reporting to the company. The whole process of marketing is not done using e-commerce. But e-commerce is used mostly in all the companies.

Secondly, from the table 4.47 (Processes involved in e-commerce of the pharmaceutical industry) it is seen that there are various processes involved which are having e-commerce in them. B2B e-commerce exists about 47.6% and B2C e-commerce exists about 30.5%. Also some companies are having combination of B2B, B2C, C2B, C2C and B2G type of e-commerce involved in their daily processes. This proves that there are all the types of e-commerce processes involved in the pharmaceutical industry. This proves that ***"Most of the pharmaceutical companies use e-commerce"***

4.47 Processes involved of e-commerce in the pharmaceutical industry

Processes	Frequency	Percent	Valid Percent	Cumulative Percent
B2C	25	30.5	30.5	30.5
B2B	39	47.6	47.6	78.0
B2C, B2B	4	4.9	4.9	82.9
B2C,C2B	1	1.2	1.2	84.1
B2B,C2B	1	1.2	1.2	85.4
B2B,B2G	3	3.7	3.7	89.0
B2C,B2B,C2B	4	4.9	4.9	93.9
B2C,B2B,B2G	1	1.2	1.2	95.1
B2C,C2B,B2G	1	1.2	1.2	96.3
B2C,B2B,C2B,C2C	1	1.2	1.2	97.6
B2C,B2B,C2B,B2G	1	1.2	1.2	98.8
B2C,B2B,C2B,C2C B2G	1	1.2	1.2	100.0
Total	82	100.0	100.0	

2) Statistical method (By Z test): Statistically this can be proved as follows -

Step 1: Setting Hypothesis

Null Hypothesis: <92% pharmaceutical companies use e-commerce.

Alternative Hypothesis: 92% or more pharmaceutical companies use e-commerce.

H0: p < 0.92

H1: p >= 0.92

Step 2: sample size

n = 90 (>30)

As n>30, large sample size i.e. Z-test is used.

4.20 Use of e-commerce in different pharmaceutical industries

Yes/No	Use of E-commerce	
	Frequency	Percentage
Yes	83	92.22
No	7	7.77
Total	90	100

Step 3: Calculation of S.E

S.E = √¯(pq/n)

= √¯(92*8 /90)

= 2.8596 where p=92, q = 8 and n= 90

Step 4: Calculation of Z value

Z = difference / S.E.

= 0.22 / 2.8596

= 0.0769

Step V:

Table value of Z for one tail test at 5% level of significance is 1.64 which is greater than calculated Z value. Hence alternative hypothesis is accepted and null hypothesis is rejected. Hence the hypothesis "***Most of the pharmaceutical companies use e-commerce"*** proved and accepted.

Summary: This hypothesis is proved by two methods – 1) statistically by using Z-test. It is seen from the above calculation that the calculated Z value is less than the table Z value which is 1.64. Hence this hypothesis "Most of the

pharmaceutical companies use e-commerce" is proved and accepted. 2) This hypothesis is also proved by majority, as seen from the above table 4.20, 92.22% companies use e-commerce. I.e. there is a majority of companies using e-commerce. Also it is seen from table 4.47 that many e-commerce processes such as B2C, B2B, C2B and B2G are used in the pharmaceutical industry. B2B e-commerce exists about 47.6% and B2C e-commerce exists about 30.5%. In addition from the table 4.20 it is seen that e-commerce is used in 92.22% companies. Hence the hypothesis ***"Most of the pharmaceutical companies use e-commerce"*** is proved.

4.21.3 The third hypothesis is ***"Manual and paper based systems are replaced with e-commerce systems for the purpose of cost benefit".***

It is seen from the survey data table no 4.55 there are five factors which can be compared for finding the cost benefit which can be obtained with the use of e-commerce. They are -1) required storage space 2) paperless office 3) speed up process 4) accuracy 5) clarity 6) transferrable.

4) ***Required storage space*** **-** It is seen from the table 4.55 that the frequency for this is 25 i.e. 25 companies are benefited by this factor for the cost and their percentage is 30.49%. It shows that required storage space is saved in 30.49% companies showing that e-commerce saves cost by this factor.

5) **Paperless office** – The frequency and percentage of the paperless office is 53 and 64.63% as seen from the same table as above (4.55) which is good enough to say that e-commerce saves cost by the factor paperless office.

6) ***Speed up the process*** – The frequency for this is 76 and percentage is 92.68% as seen from the table 4.55. This shows that almost all the companies are getting the benefit of speeding up processes. As the processes speed up the cost of the company is saved. This proves that e-commerce saves cost by speeding up the processes.

4) Accuracy – For accuracy the frequency is 60 i.e. 60 companies are getting the benefit of e-commerce in accuracy. The percentage for accuracy is 73.17%. This shows that e-commerce helps in saving cost by accuracy in pharmaceutical industry. This proves that e-commerce saves cost by accuracy of processes in the pharmaceutical industry.

5) ***Clarity*** – For clarity the frequency is 57 i.e. 69.51 companies are getting the benefit of e-commerce in clarity. The percentage for clarity is 69.51%. This shows that e-commerce helps in saving cost by clarity in pharmaceutical industry. This proves that e-commerce saves cost by clarity of processes in the pharmaceutical industry.

4.55 ways e-commerce saves cost of any pharmaceutical industry

Cost saving factor	Frequency	Percent
Required storage space	25	30.49
Paperless office	53	64.63
Speed up process	76	92.68
Accuracy	60	73.17
Clarity	57	69.51
Transferable	23	28.05
Total	82	

6) Transferable – For transferable the frequency is 23 i.e. 23 companies are getting the benefit of e-commerce in transferable. The percentage for transferable is 73.17%. This shows that e-commerce helps in saving cost by transferable factor in pharmaceutical industry. This proves that e-commerce saves cost by transferability of processes in the pharmaceutical industry.

As seen from the above figures e-commerce helps in cost benefit for the above mentioned factors, required storage space, paperless office, speed up process, accuracy, clarity and transferable factors. Hence the hypothesis is proved and is accepted.

Summary: This hypothesis ***"Manual and paper based systems are replaced with e-commerce systems for the purpose of cost benefit"*** is tested using majority method. As seen from the table that the factors, required storage space, paperless office, speed up process, accuracy, clarity and transferrable are all

having high percentages. i.e. e-commerce saves cost of the pharmaceutical companies with the use of e-commerce on the basis of above factors. Hence the hypothesis ***"Manual and paper based systems are replaced with e-commerce systems for the purpose of cost benefit"*** is proved and accepted.

CHAPTER 5

OBSERVATIONS, CONCLUSIONS, SUGGETIONS AND SCOPE FOR FURTHER RESEARCH

CHAPTER 5

OBSERVATIONS, CONCLUSIONS, SUGGETIONS AND SCOPE FOR FUTURE RESEARCH

5.1 This chapter presents the important observations made at the time of visit to the companies. It also presents the conclusions based on the survey of the pharmaceutical companies and interviews of the employees of the pharmaceutical companies. In addition it also uses the tables of the analysis from the forth chapter. As the scope of this study is limited to pharmaceutical companies from Mumbai and Pune only, the scope for further research has been discussed in this last chapter.

5.2 OBSERVATIONS

Following observations are made by the survey of the companies and the interviews of the respondent employees -

- **Website only for observation purpose**

  Every small or large organization is having a website but it is mostly for the informative purpose. Communication is done via e-mails. As was observed during the survey it was seen that every organization is having a website, but this website was not used for communication or order receiving or for any other purpose. This site just gave the information about the company and its product and location and the contact person for communication.

- **Computerized offices having internet facility**

  As seen from the survey as it is today's need all the offices in all the organizations all computerized and internet is used for communication purpose. Communication is done by e-mail mostly. Irrespective of the small or large organizations all the companies are computerized and internet is used everywhere.

- **Employees are computer literate**

  Nearly all the employees in the offices are computer literate and can undertake general work on computers. Only workers and people working in the factories are not having knowledge of computer.

- **In comparison to other industries e-commerce use is less**

  From the information obtained from the internet websites, white papers, research papers, articles and books it is seen that e-commerce use is less in pharmaceutical companies as mostly there are small organizations which are having small offices and making limited use of e-commerce. The use is only done for communication.

- **Marketing is done by medical representatives**

  As the customers can not purchase medicine without the doctors prescription the marketing of the pharmaceutical companies is done by medical representatives not to the end users or patients but to the doctors. These medical representatives report on the internet to their companies and the views are exchanged using e-commerce.

- **Only marketing offices in the major cities like Bombay**

  Factories of the pharmaceutical industries are situated at different location while marketing offices are placed in the major cities like Bombay. The actual manufacturing of the medicines is done on the plants situated at different location. Some companies export their product even their import export divisions are situated at major cities mostly in Bombay.

- **Search engines are used by the distributors for getting a particular product.**

  Some pharmaceutical companies and also the distributors use search engines for searching manufacturers of a particular product. They have their own software for searching the manufacturers of a particular product.

- **There are many companies which are not making use of e-commerce**

  There are many small scale companies which are not making use of e-commerce in different fields such as marketing and sales, advertising, human resource, research etc. Even in some big companies e-commerce use is done only for communication.

- **Company employees are making use of e-commerce but are not aware of it**

  Company employees are using e-commerce for communication like emails, making use of websites, doing reporting using e-commerce, making use for marketing and sales, advertising etc but they are having less knowledge that they are working in e-commerce.

5.3 CONCLUSIONS

5.3.1 Age group of employees

The age group of people interviewed and having knowledge of e-commerce use in the industry is as follows –

Employees in the age group of 18 to 30 years are about 18.3 percent and their frequency is 15 out of total 82. Employees in the age group of 30 to 40 years are having percentage 50 i.e. half of the interviewed people are of the age group 30 to 40 and their frequency is 41 out of 82 interviewed employees. While employees in between the age group 40-50 are 15 from total 82 respondents and their percentage are 18.3. The respondent employees from the age group 50-60 are slightly lower in percentage and it is 13.4 while the frequency of them is 11. 11 Out of 82 employees are from the age group 50 to 60. **(Table 4.1)**

5.3.2 Use of e-commerce in different pharmaceutical industries

It is seen from the table 4.20 that percentage use of e-commerce is 92.22 percent and its frequency is 83 i.e. number of companies using e-commerce are high while only few companies do not use e-commerce and their percentage is 7.77. But the use of e-commerce is limited for communication, sending e-mails etc.

5.3.3 Maximum use of e-commerce (department / organizational level)

E-commerce is used maximum at department level as compared to organizational level. This can be seen by the table 4.4. The frequency and the percentage use at department level is 56 and 68.3. At the organizational level its use is less comparatively and its frequency and percentage is 26 and 31.7 respectively.

5.3.4 Type of software use to execute daily operation

Many companies are making use of different software in their organizations. The study is under taken in order to find out the software preferred most, least and on an average.

5.3.4.1 Commercial

Commercial software is used by 20.7 percent companies and its frequency is 17. i.e. out of 82 companies 17 companies use this software. (Table 4.19)

5.3.4.2 Desktop

As seen from table 4.19 percentage use of desktop software is 13.4 which is lesser than commercial software and its frequency is still less which is 11 i.e. only 11 companies out of 82 pharmaceutical industries use desktop software.

5.3.4.3 Standard pharmaceutical

Percentage use of standard pharmaceutical software is 13.4 which is equal to percentage of desktop software. Its frequency is also equal to desktop software and is 11 as seen from the table 4.19.

5.3.4.4 ERP

ERP software is used maximum in the pharmaceutical industry. 37.8 companies use ERP software. The frequency of ERP software is 31 as seen from the table 4.19.

5.3.4.5 Home Made

Home made software is used also used to some extent and its use is equal to 13.4 which is same as standard pharmaceutical and desktop software as seen from the table 4.19.

5.3.4.6 E-commerce

E-commerce software is used very less and its percentage is 1.2 and frequency is only 1 as seen from the table 4.19.

5.3.5 Use of e-commerce for different purposes

E-commerce is used maximum for marketing and sales and its percent usage is 40.00%. For advertising like displaying company information on the website its usage is 12.00 percent. For manufacturing its usage is very less and it is 6.00%. For human resource and research the usage is 9.00% and 10%. For any other purpose like information searching etc its usage is 22% as seen from the table 4.22

5.3.6 Different software used for different purposes

- Usage of different software for marketing and sales is as follows -

  As seen from the table 4.12, ERP software is used maximum, 40.3% for ***marketing and sales***. Commercial, desktop, standard pharmaceutical and home

made software usage for ***marketing and sales*** are very less and their percentages are 17.7%, 12.9%, 14.5%, 12.9% respectively. Use of e-commerce software is negligible only1.6%. It is also seen from the table 4.12 that 62 companies out of 82 using e-commerce use different software for marketing and sales.

- Usage of different software for ***manufacturing*** is as follows -

  As seen from the table 4.13, ERP software is used maximum, 40.0% for manufacturing. Next to that commercial software is used 33.3% for manufacturing. Desktop, standard pharmaceutical and home made software usage for marketing and sales are very less and their percentages are 6.7%, 13.3%, 6.7% respectively. Use of e-commerce software is 0.00%.

- Usage of different software for ***advertising*** is as follows -

  As seen from the table 4.14, ERP software is used maximum, 47.8% for advertising. Next to that home made software is used 21.7% for advertising. Next to that commercial software is used 17.4% for advertising. Desktop and standard pharmaceutical software usage for advertising is very less and their percentages are 8.7%, 4.3% respectively. Use of e-commerce software is 0.00%.

- Usage of different software for ***human resource*** is as follows -

  As seen from the table 4.15, ERP software is used maximum, 31.3% for human resource. Next to that home made software is used 25.0% for human resource. Commercial and desktop software usage for human resource is very less and their percentage is same equal to 18.8%. Use of e-commerce software is 0.00%.

- Usage of different software for ***research*** is as follows -

  As seen from the table 4.16, ERP software is used maximum, 33.3% for ***research***. Commercial and home made software usage for ***research*** is slightly higher than desktop and standard pharmaceutical and their percentage is same 22.2. Use of desktop and standard pharmaceutical software is very less and their percentage is 5.6% and 16.7% respectively. Use of e-commerce software is 0.00%.

- It is also seen from the table 4.17; commercial and ERP software is not used in 30% organizations for the use of any other purpose. Desktop, standard pharmaceutical home made software are not used in very less organizations equal to 15%, 10.0% and 15.0% respectively for the use of any other purpose. E-

commerce software is not used in negligible organizations (0.00%) for any other purpose.

- Use of different software for ***any other purpose*** than marketing and sales, manufacturing, advertising, human resource, research is seen in the table 4.18. Percentage use of ERP software is maximum equal to 40.3% for any other purpose. Commercial, desktop, standard pharmaceutical and home made software are used very less equal to 17.7%, 12.9%, 14.5% and 12.9 % respectively for any other purpose than above mentioned works. E-commerce software is very less equal to 1.6% for the same purpose.

5.3.7 E-commerce helps in the process of implementation.

Table 4.24 shows that e-commerce helps in process of implementation in 72.00% companies and it does not help in the process of implementation in 28.00% companies. In 59 pharmaceutical companies out of 82 e-commerce helps in the process of implementation and in 23 companies it does not help in the process of implementation.

5.3.8 E-commerce enables process of manufacturing and sales.

Table 4.25 shows that e-commerce enables process of manufacturing and sales. In 86.6 percent companies' e-commerce enables process of manufacturing and sales and in 13.4 companies e-commerce does not help in the process of manufacturing and sales.

5.3.9 Benefits of e-commerce for the different categories of people

It is seen from the table 4.28 that e-commerce is benefited most to the suppliers with the percent equal to 31.7. Distributors are the next category of people getting benefited using e-commerce and their percent is 30.5. Management and end user are benefited next to them with very less percent equal to 14.6 and 11.00 percent respectively. Government agencies and manufacturers are least benefited with the percent equal to 2.4.

5.3.10 Distribution of Percent of applications in different organizations

It is seen from the table 4.32 that e-commerce use is very high in 46.3 percent organizations. E-commerce use is high in 19.5% organizations. It is average for

14.6% organizations. E-commerce use is low for 3.7% organizations and very low for 15.9% organizations.

5.3.11 Applications of e-commerce in the areas of pharmaceutical industry

5.3.11.1 Expanded Geographical Use

Very low benefit of expanded geographical use is obtained by 13 organizations and their percentage is 16%. Low benefit of expanded geographical use is obtained by 3 organizations and their percentage is 3.7%. Average benefit of expanded geographical use is obtained by 8 organizations and their percentage is 9.8%. High benefit of expanded geographical use is obtained by 16 organizations and their percentage is 20%. Very high benefit of expanded geographical use is obtained by 37 organizations and their percentage is 46%. **(Table 4.23)**

5.3.11.2 Expanded customer base

Very low benefit of expanded customer base is obtained by 2 organizations and their percentage is 2.4%. Low benefit of expanded **customer base** is obtained by 4 organizations and their percentage is 4.9%. Average benefit of expanded **customer base** is obtained by 18 organizations and their percentage is 22%. High benefit of expanded **customer base** is obtained by 24 organizations and their percentage is 29%. **(Table 4.23)**

5.3.11.3 Increase visibility through search engine marketing

Very low benefit of **Increase visibility through search engine marketing** is obtained by 2 organizations and their percentage is 2.4%. Low benefit of **Increase visibility through search engine marketing** is obtained by 6 organizations and their percentage is 7.3%. Average benefit of **Increase visibility through search engine marketing** is obtained by 10 organizations and their percentage is 12%. High benefit of **Increase visibility through search engine marketing** is obtained by 27 organizations and their percentage is 33%.Very high benefit of **Increase visibility through search engine marketing** is obtained by 25 organizations and their percentage is 30.5%. **(Table 4.23)**

5.3.11.4 Provide customer valuable business information

Very low benefit of **Provide customer valuable business information** is obtained by 2 organizations and their percentage is 2.44%. Low benefit of

Provide customer valuable business information is obtained by 2 organizations and their percentage is 2.44%. Average benefit of **Provide customer valuable business information** is obtained by 17 organizations and their percentage is 20.7%. High benefit of **Provide customer valuable business information** is obtained by 20 organizations and their percentage is 24.4%.Very high benefit of **Provide customer valuable business information** is obtained by 31 organizations and their percentage is 37.8%. (table 4.23)

5.3.11.5 Available 24/7/365 days never close

It is seen from the table 4.23 that the rating of very high and high for this factor is having highest percentage, 37.8 and 42.7 respectively while average, very low percentage is shown for

Average, low and very low ratings and is equal to 8.5, 8.5 and 1.2 respectively. This shows that e-commerce is available 24/7/365 days never close.

5.3.11.6 Provide customer valuable info

Table 4.23 shows that percentage of very high and high ratings are having highest percentages equal to 24.4 and 37.8 respectively. Comparatively average rating is having less percentage i.e. there are only 20.7 companies which are getting average valuable information. The companies getting low and very low customer valuable information are very less and their percentages equal to 13.4 and 2.4 respectively.

5.3.11.7 Build customer loyalty

As seen from the table 4.23**,** Customer loyalty has been built by some organizations using e-commerce. 26% organizations have built very high customer loyalty are 21 in number. 29% organizations which have built high customer loyalty are 24 in number. Average organizations have maximum frequency and are 19 in number and their percentage is 23%. Fewer organizations have built low customer loyalty with and their percentage is 8.5%. Less organizations have very low frequency equal to 4 i.e. very few organizations build very low customer loyalty with percentage equal to 4.9%.

5.3.11.8 Reduction of marketing and advertising cost

The table 4.23 gives the frequency distribution of organizations which are benefited by e-commerce in reduction and advertising cost. The organizations having very high benefit of reduction of marketing and advertising cost are having frequency equal to 27 and their percentage is 32.9%. High reduction marketing and advertising cost is obtained by 22 organizations and their percentage is 26.8%. Average reduction of marketing and advertising cost is obtained by 16 organizations and their percentage is 20%. Organizations with low reduction in marketing and advertising cost are with frequency equal to 10 and their percentage is 12% Organizations with very low frequency in reduction in marketing and advertising cost are having percent equal to 1.2%.

5.3.11.9 Collection of customer data

This benefit is obtained very low by 5 organizations and their frequency is 6.1. Collection of customer data benefit is obtained very low by 5 organizations and their frequency is 6.1. Collection of customer data benefit is obtained by 22 organizations and their percentage is 27. Average benefit on collection of customer data is obtained by 22 organizations and their percentage is 27%. High benefit on collection of customer data is obtained by 23 organizations and their percentage is 28%. Very high benefit on collection of customer data is obtained by 23 organizations and their percentage is 28% (Table 4.23).

5.3.12 Factors influencing e-commerce development in pharmaceutical industry

5.3.12.1 Factors influencing e-commerce development with telecomm infrastructure, government regulations and related supporting industries

Table 4.44 shows correlation between telecomm infrastructure and related supporting industries is .354. It shows correlation is significant at 0.01 level and it is weak positive correlation. ***Concluding that as the telecomm infrastructure improves related and supporting industries grow.*** Correlation of logistic system with related and supporting industries is significant at 0.01 level with the value equal to .402. ***Concluding that as the logistic system improves related and supporting industries grow.*** Correlation of managing and organizing with government regulations is significant at 0.05 level with the value equal to .260.

Concluding that as the managing and organizing functions improves government regulations improve. Correlation of e-commerce with government regulations and related and supporting industries is significant at 0.01 level with the values equal to .285 and 496. ***Concluding that as e-commerce grows government regulations improve .***Correlation of consumer demand e-commerce with telecomm infrastructure and related and supporting industries is significant at 0.01 level with the value equal to .363 and .382 respectively. ***Concluding that as the*** **consumer demand e-commerce** ***improves*** **telecomm infrastructure improves and** ***related and supporting industries grow.*** Correlation of business demand for e-commerce with related and supporting industries is significant at 0.05 level with the value equal to 281. ***Concluding that as the*** **business demand e-commerce** ***improves related and supporting industries grow.***

5.3.12.2 Correlation between all the factors influencing e-commerce with logistic system, managing and reorganizing and e-commerce

In the table 4.45 correlations of government regulations with managing and organizing is .260. It shows that correlation is significant at ***0.05 level.*** ***Concluding that as the*** **government regulations** ***improve*** **managing and organizing improves** Correlation of government regulations with e-commerce is .285. This shows that the correlation is significant at ***0.01 level.*** ***Concluding that as the*** **government regulations** ***improve*** **e-commerce improves** Correlation of related supporting industries with logistic system and e-commerce is significant at 0.01 level with the values equal to .402 and 496. ***Concluding that as the*** **related supporting industries** ***improve*** **logistic system improves** Correlation of logistic system with managing and organizing and e-commerce is significant at 0.01 level with the values equal to .337 and 618. ***Concluding that as the*** **logistic system** ***improves*** **managing and organizing improves** Correlation of consumer demand e-commerce with logistic system is significant at 0.05 level with the value equal to .239 while Correlation of consumer demand e-commerce with e-commerce is significant at .01 level with the value equal to .497. ***Concluding that as the*** **consumer demand e-commerce** ***improves*** **logistic system improves while as the consumer demand e-commerce improves e-commerce improves.**

Correlation of business demand e-commerce with logistic system and e-commerce is significant at the 0.01level with the values equal to .314 and .380 respectively. ***Concluding that as the*** **business demand logistic system and e-commerce *improves* logistic system improves.**

5.3.12.3 Correlation between all the factors influencing e-commerce with consumer demand e- commerce and business demand e-commerce

Table 4.46 shows correlation of all the factors influencing e-commerce with consumer demand e-commerce.and business demand e-commerce is shown. Telecomm infrastructure is correlated with consumer demand e-commerce and it has a value equal to. 363 showing ***0.01 level 2-tailed and weak positive*** correlation. Telecomm infrastructure is correlated with business demand e-commerce and its value is .013 showing ***weak positive correlation*** It shows that correlation is significant at ***0.05 level. Concluding that as telecomm infrastructure improves consumer demand ecommerce and business demand e-commerce improves.***

In the second row government regulations are correlated with consumer demand e-commerce and business demand e-commerce and its values are .185 and .046 respectively which shows weak positive correlation. ***Concluding that as government regulations improves consumer demand ecommerce and business demand e-commerce improves.***

In the third row related and supporting industries are correlated with consumer demand e-commerce and its value is .382 which shows 0.01 level significant 2 tailed and weak positive correlation while related and supporting industries are correlated with business demand e-commerce and its value is .281 which shows weak positive 0.05 level signed 2-tailed correlation for the sample of 82 pharmaceutical companies. ***Concluding that as related and supporting industries improves consumer demand ecommerce and business demand e-commerce improves.***

In the fourth row logistic system are correlated with consumer demand e-commerce and its value is .239 which shows 0.05 level significant 2 tailed and weak positive correlation while logistic systems are correlated with business

demand e-commerce and its value is .314 which shows weak positive and 0.01 level signed 2-tailed correlation for the sample of 82 pharmaceutical companies. ***Concluding that logistic system improves consumer demand ecommerce and business demand e-commerce improves.***

In the fifth row managing and organizing is related with consumer demand e-commerce the value of it is 0 showing no correlation between them. Managing and organizing is related with business demand e-commerce showing value equal to .184 showing ***weak positive correlation. Concluding that managing and organizing improves consumer demand ecommerce and business demand e-commerce improves.***

In the sixth row e-commerce is related with consumer demand e-commerce the value of it is 0.497 showing ***moderate positive correlation*** between them where as e-commerce is related with business demand e-commerce and its value is 0.380. This indicates ***0.01 level significant 2 tailed and weak positive correlations. Concluding that e-commerce improves consumer demand ecommerce and business demand e-commerce improves.***

In the seventh row consumer demand e-commerce is related with consumer demand e-commerce the value of it is 1 showing ***perfect positive correlation*** between them. Where as e-commerce is related with business demand e-commerce and its value is .475 which shows ***0.01 level significant, 2 tailed and moderate positive correlation. Concluding that as consumer demand ecommerce improves and business demand e-commerce improves.***

In the eighth row business demand e-commerce is related with consumer demand e-commerce the value of it is .475 showing ***moderate positive correlation*** and 0.01 level 2 tailed correlation between them. Where as e-commerce is related with business demand e-commerce and its value is 1, this shows ***perfect positive correlation.*** Concluding that as business demand ecommerce improves and consumer demand e-commerce improves.

5.3.13 The technology more suitable for pharmaceutical industry

A seen from table 4.48 the technology more suitable for pharmaceutical industry is (***Javascript/HTML/XML/Borland C++/Java).*** This technology is used to the large extent with the frequency equal to 49 and percentage equal to 59.8. This is clear from this figures that 49 pharmaceutical firms out of 82 firms use above presentation services.

From the ***Middleware Business objects Tier*** the technologies such as .***Net, OBBC, ASP, OLE/DB, COM+, DCOM etc*** are used less and the frequency and percentage of it is 14 and 17.1.i.e. only 14 firms out of 82 firms use this technology.

From the group Application Server Administration, Deployment, Configuration Management the technologies such as Windows Shell Prog., Windows 2000 Application server etc are used only 6.1 percent. Only 5 companies out of 82 companies use this technology.

From ***Content Management and usability group*** the technologies such as ***Visual Interdev, Front page*** are used very less and their frequency is only one out of 82 pharmaceutical companies and the percentage usage is 1.2 percent only.

From ***Database Services / Data source Tier*** the technologies such as ***SQL Server, IIS, MTS, Solaries OS, Site Server,Oracle, Sybase*** etc are used very less and their percentage is very less, 4.9 percent. The frequency of use is only 4 out of 82. This shows that this technology is used very less in the pharmaceutical industry.

The companies using both ***presentation services*** such as ***(Javascript /HTML/XML/Borland C++/Java) and Middleware Business objects*** Tie the technologies such as ***.Net, OBBC, ASP, OLE/DB, COM+, DCOM etc*** are also having percentage 3.7 and their frequency is 3 which is very less. (Table 4.48)

5.3.14 Different processes involved of e-commerce

From table 4.47 the different processes involved of e-commerce are B2B, B2C, C2B, C2C, and B2G. Out of which B2B and B2C are more popular. The frequency and percentage of B2C is 25 and 305. This is seen from the table 4.11.

Whereas B2B has frequency equal to 39 and percentage equal to 47.6 which is nearly half of the total processes. Other processes are used very less.

Some companies use combination of B2C and B2B there frequency and percentage are 4 and 4.9 respectively. Some firms only have B2c and C2B processes. The frequency of such firms is 1 and the percentage is 1.2 which is negligible. Some pharmaceutical industries use B2B and B2G processes. Their frequency is 3 and percentage is 3.7. This is also a very low percentage. Some companies have three processes involved which are B2C, B2B and C2B. Their frequency and percentage is 4 and 4.9 respectively. This percentage is also very low. Companies using – 1) B2C, B2B and B2G 2) B2C, C2B and B2G 3) B2C, B2B, C2B and C2C 4) B2C, B2B, C2B and B2G 5) B2C, B2B, C2B, C2C and B2G are having very low frequency and percentage. These are 1 and 1.2 respectively. Some firms use B2B and C2B their percentage is also negligible.

5.3.15 Factors affecting e-commerce development

As it is seen from the table 4.55, E-commerce saves cost by the factors such as speeding up process, accuracy, clarity, transferable and paperless office.

5.3.15.1 Required Storage Space

The frequency for this is 25 i.e. 25 companies are benefited by this factor for the cost and their percentage is 30.49%. It shows that required storage space is saved in 30.49% companies showing that e-commerce saves cost by this factor.

5.3.15.2 Paperless office

Paperless office with the use of e-commerce also saves the cost of the industry. As seen by the frequency and percentage equal to 53 and 64.63 % respectively

5.3.15.3 Speeding up process

The frequency for this is 76 and percentage is 92.68% . This shows that almost all the companies are getting the benefit of speeding up processes. As the processes speed up the cost of the company is saved. This proves that e-commerce saves cost by speeding up the processes.

5.3.15.4 Accuracy- For accuracy the frequency is 60 i.e. 60 companies are getting the benefit of e-commerce in accuracy. The percentage for accuracy is 73.17%. This

shows that e-commerce helps in saving cost by accuracy in pharmaceutical industry.

5.3.15.5 Clarity

For clarity the frequency is 57 i.e. 69.51 companies are getting the benefit of e-commerce in clarity. The percentage for clarity is 69.51%. This shows that e-commerce helps in saving cost by clarity in pharmaceutical industry.

5.3.15.6Transferable

For transferable the frequency is 23 i.e. 23 companies are getting the benefit of e-commerce in transferable. The percentage for transferable is 73.17%. This shows that e-commerce helps in saving cost by transferable factor in pharmaceutical industry. (Table 4.55)

5.3.16 Issues faced by e-commerce

Numbers of issues are faced by e-commerce which are discussed below.

5.3.16.1 Technological barrier

No of companies facing technological barrier problem are 48.6 percent. This problem is faced by nearly half of the companies.

5.3.16.2 Infrastructure

Infrastructure problem is faced by 40.2% companies as given by the figures in table no 4.52.

5.3.16.3 Computer literacy

Computer literacy problem is also faced by 51.2% companies as given by the figures in table no 4.52

5.3.16.4 Resistance for changing to new technology

This problem is also faced by 40.2% companies. Also the observations at the field visit and the interviews of the respondents reveal the same fact. The people are using new technology and are trying to change to new technology.

5.3.16.5 Security problems

Security problem is also faced by half of the companies and it is 49.9 percent of companies as given by the figures in table no 4.52.

5.3.16.6Man power

Man power problem is very less only 10.2 percent. i.e Only 10.2 % companies has man power problem.

5.3.16.7Any other

Other problems are negligible only 1.2 percent and the frequency is 1.

5.3.17 Payment system used by the pharmaceutical industry

As seen from the table 4.51 payment systems used by the pharmaceutical industry are as follows

5.3.17.1Use of credit card

The percentage of it is 18.2% which indicates that the use of credit card is very less as given by the figures in table no 4.51. This shows that credit card is used very less for the payment. The information gathered from the observations and interviews taken also shows that the payment is not done by using credit card. Payment is only done by means of cheques due to security problems.

5.3.17.2 Digital cash

Digital cash is also used very less, lesser than credit card . The percentage of its usage is 12.1 percent as given by the figures in table no 4.51. Generally, payment is done using cheques.

5.3.17.3 Online stored value system

Its percentage is also very less equal to digital cash usage percentage and it is 12.1 percent as given by the figures in table no 4.51. This indicates that online stored value system is used very less.

5.3.17.4B2B payment system

The use of this system is very high and it is 41.3 % as given by the figures in table no 4.51. This indicates that this system is used many times for the payment in the pharmaceutical industry.

5.3.17.5 Cheque payment

This system is used to many times and its percentage use is 30.5 and the frequency of it is 25 as given by the figures in table no 4.51. This shows that this system is used very often.

5.3.17.6 There are some pharmaceutical firms which use combination of credit card and digital cash but there frequency is only 1 and the percentage of it is 1.2. This shows that the use is negligible.

1) Some companies use credit card and online stored value system. But the frequency and percentage of it is very less and it is 2 and 2.4 respectively.
2) Some companies use credit card and cash payment. But the frequency and percentage of it is very less and it is 2 and 2.4 respectively.
3) Some companies use digital cash and cash payment. But the frequency and percentage of it is very less and it is 2 and 2.4 respectively.
4) Some companies use online stored value system and six systems. But the frequency and percentage of it is very less and it is 3 and 3.7 respectively. (table 4.51)
5) Some companies use credit card, digital cash and six systems. But the frequency and percentage of it is very less and it is 1 and 1.2 respectively. (table 4.51)
6) Some companies use credit card, online stored value system and six systems. But the frequency and percentage of it is very less and it is 1 and 1.2 respectively. (table 4.51)
7) Some companies use online stored value system and B2B payment system, and six systems. But the frequency and percentage of it is very less and it is 1 and 1.2 respectively. (table 4.51)

Summary of Conclusions:

As was seen during the survey that Employees in the age group of 30 to 40 years are having percentage 50. There is high usage of e-commerce (92.22%) in the pharmaceutical industry. Maximum usage of e-commerce is at the department level which is 68.3% comparative to the 26% usage at organizational level. ERP software usage is maximum and it is 37.8%. E-commerce helps in the process of implementation (72%). E-commerce enables process of manufacturing and sales. E-commerce is benefited the most for suppliers and distributors. Very high usage of e-commerce is in 46.3% pharmaceutical companies. The technology more suitable for pharmaceutical industry is presentation services making use of (***Javascript/HTML/XML/Borland C++/Java).*** The different processes involved

of e-commerce are B2B, B2C, C2B, C2C, and B2G. Out of which B2B and B2C are more popular. The frequency and percentage of B2C is 25 and 30.5. E-commerce does not save cost by the factors such as speeding up process, accuracy, clarity, transferable and paperless office. The percentages of different issues faced by e-commerce such as **Technological barrier-48.6%, infrastructure-40.2%, computer literacy-51.2%, Resistance for changing to new technology-40.2%, security problems-49.9% and man power-10.8%** are faced by nearly half of the companies. Different payment systems are used by the pharmaceutical industry like 1) credit card (usage 18.2%), digital cash (usage 12.1%), online stored value system (usage 12.1%), B2B payment system (41.3%), cheque payment (usage 30.3%).

5.4 SUGGETIONS

5.4.1 Factors affecting e-commerce should be minimized.

Technological barrier, infrastructure computer literacy, resistance for changing to new technology, security problems , man power are the problems faced by the pharmaceutical industry in the use of e-commerce but this problems are not prominent as seen from the table 4.52. But these problems can be sorted to make the working of the industry faster and to make proper use of e-commerce. For the same proper infrastructure should be provided for the smooth working of internet. Limitations for the use of internet should be overcome. Proper Security of the data on the internet should be provided. Technological barriers should be overcome. There is very less resistance for changing to new technology but use of e-commerce is limited which should be increased and to do this continuous training to the employees and improvement in the technology should be done.

5.4.2 Use of e-commerce for different purposes

It is seen from the table 4.22 that the use of e-commerce for marketing and sales is 40 percent i.e. use of e-commerce for marketing and sales is only 40%. This use of e-commerce should be increased. Also there is very less use of e-commerce for manufacturing, advertising, human resource and research with the percentages equal to 6%, 12%, 9% and 10% respectively. The use of e-commerce in these areas should be increased.

5.4.3 Use of e-commerce at department and organizational level

It is seen from the table 4.4 that use of e-commerce is less at the organizational level (31.7%) while at the departmental level it is 68.3%. The use of e-commerce at both the levels should be increased.

5.4.4 Use of e-commerce for implementation

It is seen from the table 4.24 that e-commerce helps in the process of implementation and its percentage is 72%. This may be due to the fact that some SMEs are not using e-commerce as it was observed in the survey and interview with the employees of the pharmaceutical industries. These pharmaceutical industries should start using e-commerce.

5.4.5 Use of e-commerce for manufacturing and sales

It is seen from table 4.25 and from the interviews with employees of the pharmaceutical industry it is seen that e-commerce enables process of manufacturing and sales and its percentage is 86.6%. Therefore e-commerce should be used by all the pharmaceutical companies for **manufacturing** and sales.

5.4.6 Proper training to the employees

It is seen from the table 4.28, e-commerce is benefited for suppliers and distributors and their percentages are 31.7% and 30.5% which is very less. Also it is lesser than that for end user, employees and management people. It is negligible (2.4%) for government agencies and manufacturers. This less percentage may be due to the computer literacy problem. This problem can be sorted by the proper training of end users, employees, management, suppliers, distributors, government agencies and manufacturers.

5.4.7 Applications of e-commerce in the pharmaceutical industry

As seen from the table 4.35, e-commerce is ***available 24/7/365 never close*** but its use is limited the use of it should be increased. Also it is seen from the table 4.36 that it provides **customer valuable information** but its percentages are less for high (37.8%) and very high (24.4%) ratings i.e. only the respondents with these percentages are getting this benefit. E-commerce use is increased many companies will get this benefit. **Customer loyalty** is also build by some e-

commerce users but its percentage is very less it should be increased. High (26.8%) and very high (32.9%) **reduction of marketing and advertising cost** has been maintained by some pharmaceutical companies with the use of e-commerce. This percentage will increase with the increase in the use of e-commerce. Initiatives should be taken to use ecommerce for saving marketing and advertising cost.

5.4.8 Payment system used by pharmaceutical companies

Payment done by pharmaceutical industries is cheque payment mostly. Companies can use other options of ecommerce payment like credit cash, digital cash, online stored value system, B2B payment system to do the payment in the timely manner without delay.

5.5 SCOPE FOR FURTHER RESEARCH

5.5.1 Geographical Limitations of the thesis

The research is under taken for the pharmaceutical companies in Mumbai and Pune only, The research can be extended further for all the pharmaceutical companies in India and further all over the world and different countries to the impact of e-commerce in the pharmaceutical industry.

5.5.2 Research in different fields

Similar type of research can be carried out in different fields like mechanical, electrical, electronic and chemical industries to test the use and effect of e-commerce on the different industries.

5.5.3 Research for different systems

Research can also be carried out for air line reservation system or hotel booking system to find use of e-commerce as the use of e-commerce is the highest in these type of systems which are online and which are totally dependant on the websites.

5.5.4 Research for government agencies

Research can also be carried out in other areas for government agencies to find the use of e-commerce.

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ANNEXURE-1

CRITICAL STUDY OF E-COMMERCE IN THE PHARMACEUTICAL INDUSTRY

By Prof. Archana R. Wafgaonkar (Ph.D Research Student)

Questionnaire

(Please tick whichever is applicable)

Personal Information

1.Name (optional)

_____

2.E-mail:

_____

3.Address _____

_____

_____

4. Age (In years) :

1) 20-30 ☐ 2) 30-40 ☐ 3) 40-50 ☐

4) 50-60 ☐ 5) More than 60 ☐

5. Designation

_____

6.Name of the organization

_____

URL:_____

7. Do you have computerization in the organization ? (Y/N) Yes ☐ No ☐

If yes, what level – 1) Department ☐ 2) Organizational ☐

8. What type of software do you use to execute your daily operation ?

i) Commercial ☐ ii) Desktop ☐ iii) Standard pharmaceutical ☐

iv) ERP ☐ v) Home made ☐ vi) E-commerce ☐

9) Do you use e-commerce ? (Y/N) Yes ☐ No ☐

If yes what purpose ?

i) Marketing, Sales ☐

ii) Manufacturing ☐

iii) Advertising ☐

iv) Human Resource ☐

v) Research ☐

vi) Any Other Than This:_____ ☐

10) E-commerce is benefited for (assign the weight in the range of 0(lowest(highest))

i) End user ☐

ii) The employees ☐

iii) Management ☐

iv) Suppliers ☐

vi)Distributors ☐

vii) Government agencies ☐

viii) Manufacturers ☐

11) Applications of e-commerce in the areas of pharmaceutical industry (ratings 0(lowest)-5(highest))

i) Expanded geographical use ☐

ii) Expanded customer base ☐

iii) Increase visibility through search engine marketing ☐

iv) Provide customer valuable business information ☐

v) Available 24/7/365 never close ☐

vi) Provide customer valuable Info ☐

vii) Build customer loyalty ☐

viii) Reduction of marketing and advertising cost ☐

ix) Collection of customer data ☐

12) Does e-commerce help in process implementation? (Y/N) Yes ☐ No ☐

Does it enable process of manufacturing & sales (Y/N) Yes ☐ No ☐

How?

_____

_____

13) Factors influencing e-commerce development in pharmaceutical industry
(Factor details ratings 1(lowest)-5(highest))

i) National

i) Telecomm Infrastructure ☐ ii) Government regulations ☐

ii) Related & supporting industries

i) Payment ☐ ii) logistic systems ☐

iii) Firm strategy structure

i) Managing & organizing ☐ ii) E-commerce ☐

iv) Demand condition

a) consumer demand e-commerce ☐

b) business demand for e-commerce ☐

14) What are the processes involved in e-commerce of the pharma industry ?

1) B2C ☐ 2) B2B ☐

3) C2B ☐ 4) C2C ☐

5) B2G ☐

15) Which technology is more suitable for e-commerce in pharmaceutical industry?

i) Presentation Services /User Interface Tier
(Javascript / HTML / XML / Borland C++/ Java)

☐

ii) Middleware Business objects Tier
(.Net, OBBC, ASP, OLE/DB, COM+, DCOM etc)

☐

iii) Application Server Administration, Deployment, Configuration Management
(Windows Shell Prog., Windows 2000 Application server etc)

☐

iv) Content Management and usability(Visual Interdev , Front page)

☐

v)Database Services / Data source Tier
(SQL Server, IIS, MTS, Solaries OS, Site Server,Oracle, Sybase etc)

☐

16) In what way e-commerce save the cost of any pharmaceutical industry ?

i) Required storage space ☐ ii) Paperless ☐

iii) Speed up process ☐ iv) Accuracy ☐

v) Clarity ☐ vi) Transferable ☐

vii) Any other ☐

17) What are the issues in E-commerce faced by the pharmaceutical industry?

i) Technological barrier ☐

ii) Infrastructure ☐

iii) Computer literacy ☐

iv)Resistance for changing to new technol ☐

v) Security problems ☐

vi) Man Power ☐

vii) Any Other :_____ ☐

18) What payment system you are using?(Tick Mark in the appropriate box)

i) Use of credit card ☐ ii) Digital Cash ☐

iii) Online stored value ☐ iv) Stored value ☐

v) B2B payment Syster ☐

19) Personal opinion about the system :

20) Actual use of E-commerce in short in various areas of the industry

Signature