E-Commerce and Governance (IT- 721)

UNIT- 1ST

Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

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1. Introduction to e-Commerce:

Electronic Commerce, commonly known as **e-commerce**, **eCommerce** or **e-comm**, refers to the buying and selling of products or services over electronic systems such as the Internet and other computer networks. However, the term may refer to more than just buying and selling products online. It also includes the entire online process of developing, marketing, selling, delivering, servicing and paying for products and services. The amount of trade conducted electronically has grown extraordinarily with widespread Internet usage. The use of commerce is conducted in this way, spurring and drawing on innovations in electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. Modern electronic commerce typically uses the World Wide Web at least at one point in the transaction's life-cycle, although it may encompass a wider range of technologies such as e-mail, mobile devices and telephones as well.

A large percentage of electronic commerce is conducted entirely in electronic form for virtual items such as access to premium content on a website, but mostly electronic commerce involves the transportation of physical items in some way. Online retailers are sometimes known as e-tailers and online retail is sometimes known as **e-tail**. Almost all big retailers are now electronically present on the World Wide Web.

Electronic commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of business transactions.

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

i) Matching buyers and sellers,
ii) Facilitating commercial transactions, and
iii) Providing legal infrastructure.

Information technology permeates all the three functions and also helps to increase market efficiency and reduce transaction costs. The interaction between participants is supported by electronic trade processes that are basically search, valuation, payment and settlement, logistics, and authentication, as shown in Figure 1. The Internet and the World Wide Web allow companies to efficiently implement these key trading processes. For instance, many search services and brokers are available to help buyers find information, products, and merchants in electronic markets.

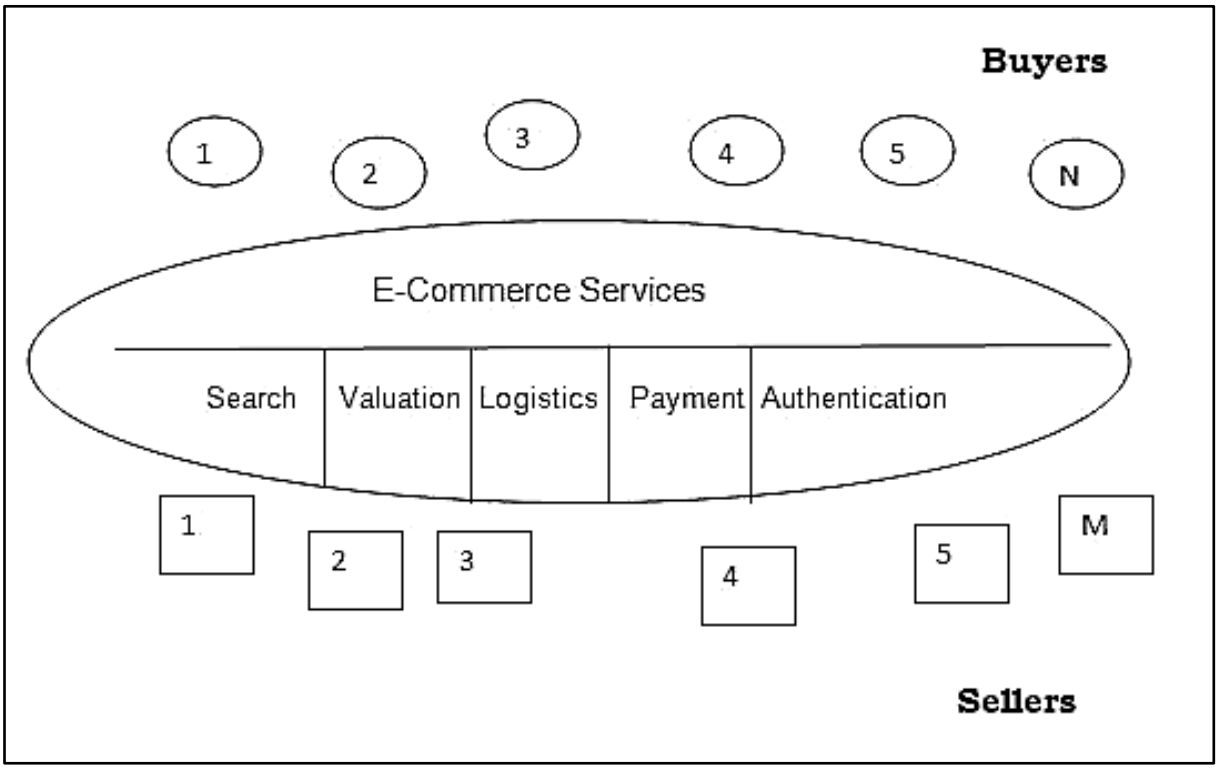

Fig 1. Representation of an e-market.

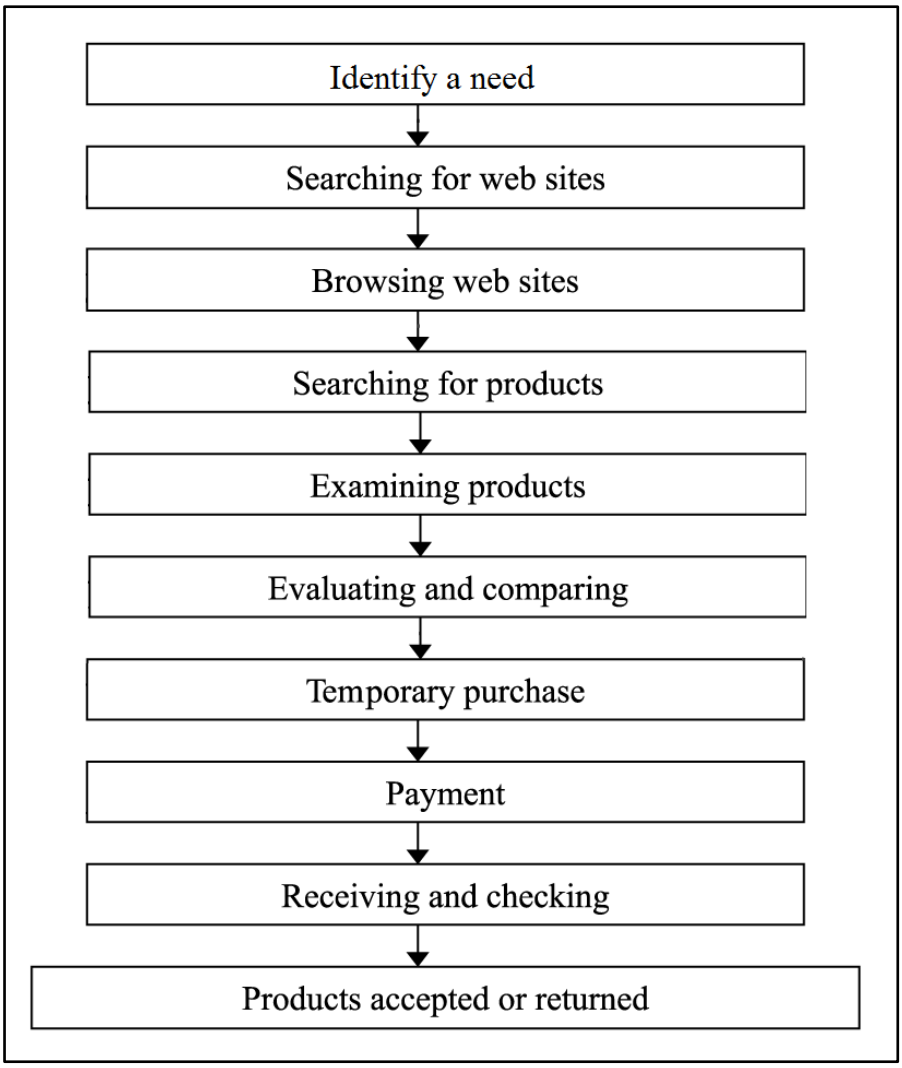

Fig 2. Typical process flow in e-commerce .

Is e-commerce the same as e-business?

While some use e-commerce and e-business interchangeably, they are distinct concepts. In e-commerce, information and communications technology (ICT) is used in inter-business or inter-organizational transactions (transactions between and among firms/organizations) and in business-to-consumer transactions (transactions between firms/organizations and individuals).

In e-business, on the other hand, ICT is used to enhance one's business. It includes any process that a business organization (either a for-profit, governmental or non-profit entity) conducts over a computer-mediated network. A more comprehensive definition of e-business is: "*The transformation of an organization's processes to deliver additional customer value through the application of technologies, philosophies and computing paradigm of the new economy*."

History of e-Commerce

Originally, electronic commerce was identified as the facilitation of commercial transactions electronically, using technology such as Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT). These were both introduced in the late 1970s, allowing businesses to send commercial documents like purchase orders or invoices electronically. The growth and acceptance of credit cards, automated teller machines (ATM) and telephone banking in the 1980s were also forms of electronic commerce. Another form of e-commerce was the airline reservation system typified by Sabre in the USA and Travicom in the UK.

From the 1990s onwards, electronic commerce would additionally include enterprise resource planning systems (ERP), data mining and data warehousing.

In 1990, Tim Berners-Lee invented the World Wide Web, web browser and transformed an academic telecommunication network into a worldwide everyman everyday communication system called internet/www. Commercial enterprise on the Internet was strictly prohibited by NSF until 1995. Although the Internet became popular worldwide around 1994 with the adoption of Mosaic web browser, it took about five years to introduce security protocols and DSL allowing continual connection to the Internet. By the end of 2000, many European and American business companies offered their services through the World Wide Web. Since then people began to associate a word "ecommerce" with the ability of purchasing various goods through the Internet using secure protocols and electronic payment services.

Business Applications

Some common applications related to electronic commerce are the following:

- Document automation in supply chain and logistics
- Domestic and international payment systems
- Enterprise content management
- Group buying
- Automated online assistants
- Instant messaging
- Newsgroups
- Online shopping and order tracking
- Online banking
- Online office suites
- Shopping cart software

- Teleconferencing
- Electronic tickets

2. e-Business Models/ Categories:

The major different types of e-commerce are: business-to-business (B2B); business-to- consumer (B2C); business-to-government (B2G); and consumer-to-consumer (C2C).

Business-to-Business (B2B): Describes commerce transactions between businesses, such as between a manufacturer and a wholesaler, or between a wholesaler and a retailer.

The volume of B2B (Business-to-Business) transactions is much higher than the volume of B2C transactions (about 80 % of total e-commerce). The primary reason for this is that in a typical supply chain there will be many B2B transactions involving sub components or raw materials, and only one B2C transaction, specifically sale of the finished product to the end customer. For example, an automobile manufacturer makes several B2B transactions such as buying tires, glass for windscreens, and rubber hoses for its vehicles. The final transaction, a finished vehicle sold to the consumer, is a single (B2C) transaction.

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

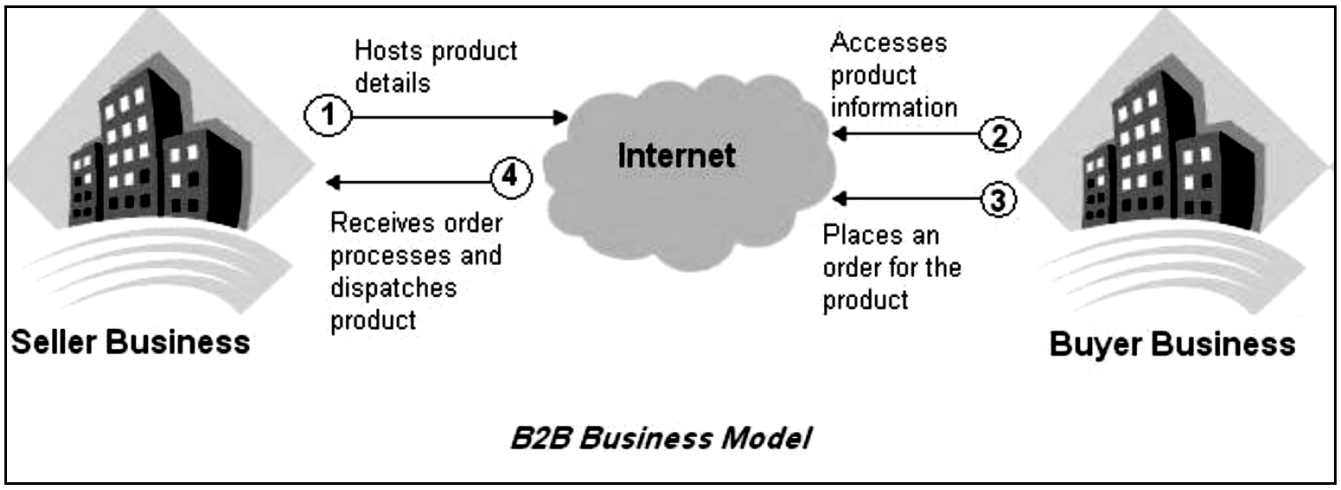

Fig 3. B2B Model.

Business-to-Consumer (B2C): Business-to-consumer e-commerce, or commerce between companies and consumers, involves customers gathering information; purchasing physical goods (i.e., tangibles such as books or consumer products) or information goods (or goods of electronic material or digitized content, such as software, or e-books); and, for information goods, receiving products over an electronic network.

It is the second largest and the earliest form of e-commerce. Its origins can be traced to online retailing (or e-tailing). Thus, the more common B2C business models are the online retailing companies such as Amazon.com, Drugstore.com, Beyond.com, Barnes and Noble and ToysRus. Other B2C examples involving information goods are E-Trade and Travelocity.

The more common applications of this type of e-commerce are in the areas of purchasing products and information, and personal finance management, which pertains to the management of personal investments and finances with the use of online banking tools (e.g., Quicken). B2C e-commerce reduces transactions costs (particularly search costs) by increasing consumer access to information and allowing consumers to find the most competitive price for a product or service. B2C e-commerce also reduces market entry barriers since the cost of putting up and maintaining a Web site is much cheaper than installing a “brick-and-mortar” structure for a firm. In the case of information goods, B2C e-commerce is even more attractive because it saves firms from factoring in the additional cost of a physical distribution network. Moreover, for countries with a growing and robust Internet population, delivering information goods becomes increasingly feasible.

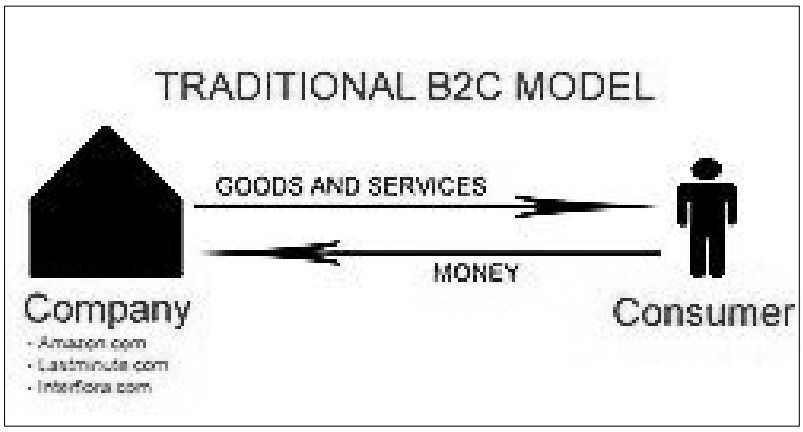

Fig 4. B2C Model.

Consumer-to-Consumer (C2C): (or *citizen-to-citizen*) electronic commerce involves the electronically facilitated transactions between consumers through some third party. A common example is the online auction, in which a consumer posts an item for sale and other consumers bid to purchase it; the third party generally charges a flat fee or commission. The sites are only intermediaries, just there to match consumers. They do not have to check quality of the products being offered.

This type of e-commerce is characterized by the growth of electronic marketplaces and online auctions, particularly in vertical industries where firms/businesses can bid for what they want from among multiple suppliers. It perhaps has the greatest potential for developing new markets.

Consumer-to-Business (C2B): Is an electronic commerce business model in which consumers (individuals) offer products and services to companies and the companies pay them. This business model is a complete reversal of traditional business model where companies offer goods and services to consumers (business-to-consumer = B2C). We can see this example in blogs or internet forums where the author offers a link back to an online business facilitating the purchase of some product (like a book on Amazon.com), and the author might receive affiliate revenue from a successful sale.

This kind of economic relationship is qualified as an inverted business type i.e. consumer is the seller and the business organization is the buyer. In this kind of a

transaction, the consumers decide the price of a particular product rather than the supplier.

The Various Models in the e-Governance Scenario are:

- **Government-to-Government (G2G):** This model involves transactions between 2 governments. For example, if the American government wants to by oil from the Arabian government, the transaction involved are categorized in the G2G model.

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

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

- **Government-to–Business (G2B):** This model involves transaction between a government and business organization. For e.g. the government plans to build a fly over. For this the government request for tenders from various contractors. Government can do this over the internet by using G2B model.

- **Business-to-Government (B2G):** Generally defined as commerce between companies and the public sector. It refers to the use of the Internet for public procurement, licensing procedures, and other government-related operations. A web-based purchasing policy increases the transparency of the procurement process and reduces the risk of irregularities. To date, however, the size of the B2G ecommerce market as a component of total e-commerce is insignificant, as government e-procurement systems remain undeveloped.

Figure 5 shows the three main elements of electronic commerce. The figure presents a rough approximation of the relative sizes of these elements. In terms of dollar volume and number of transactions, B2B electronic commerce is much greater than B2C electronic commerce. However, the number of supporting business processes is greater than the number of all B2C and B2B transactions combined.

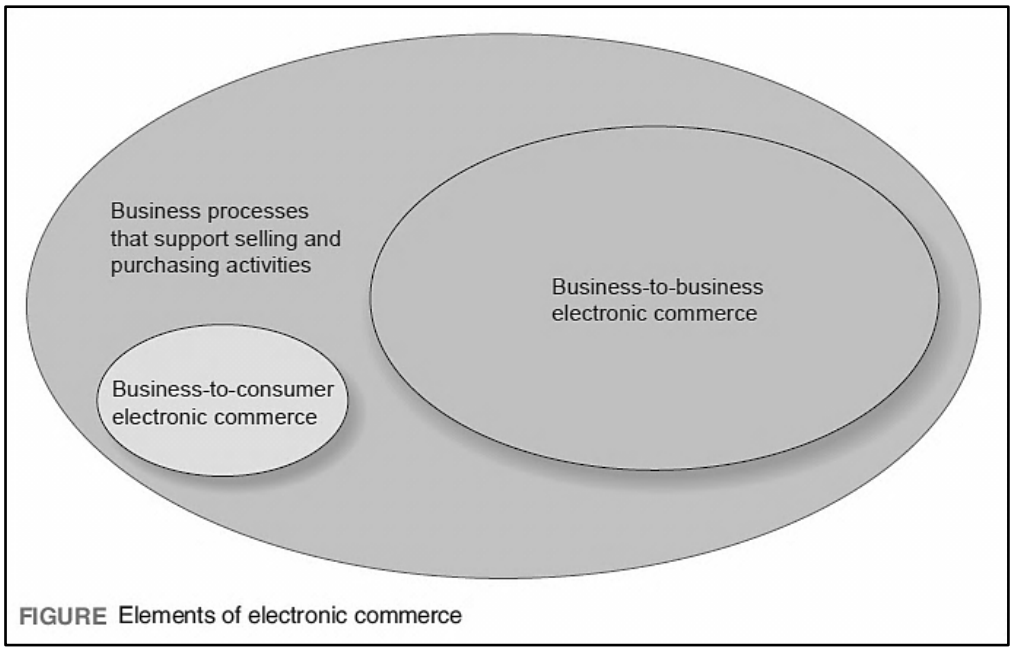

Fig 5. Major Elements of E-Commerce.

The large oval in Figure 5 that represents the business processes that support selling and purchasing activities is the largest element of electronic commerce. This section provides some background and explains how business processes are built from their component parts, activities, and transactions.

Figure 6 summarizes the major categories of electronic commerce.

Category	Description	Example
Business-to-consumer (B2C)	Businesses sell products or services to individual consumers.	Walmart.com sells merchandise to consumers through its Web site.
Business-to-business (B2B)	Businesses sell products or services to other businesses.	Grainger.com sells industrial supplies to large and small businesses through its Web site.
Business processes that support buying and selling activities	Businesses and other organizations maintain and use information to identify and evaluate customers, suppliers, and employees. Increasingly, businesses share this information in carefully managed ways with their customers, suppliers, employees, and business partners.	Dell Computer uses secure Internet connections to share current sales and sales forecast information with suppliers. The suppliers can use this information to plan their own production and deliver component parts to Dell in the right quantities at the right time.
Consumer-to-consumer (C2C)	Participants in an online marketplace can buy and sell goods to each other. Because one party is selling, and thus acting as a business, this book treats C2C transactions as part of B2C electronic commerce.	Consumers and businesses trade with each other in the eBay.com online marketplace.
Business-to-government (B2G)	Businesses sell goods or services to governments and government agencies. This book treats B2G transactions as part of B2C electronic commerce.	CA.gov procurement site allows businesses to sell online to the state of California.

Fig 6. Summary of Major Categories of E-Commerce.

3. Legal Environment of Electronic Commerce:

Introduction

The global spread of Internet creates favorable conditions for the growth of electronic commerce. At the same time, this is a challenge to the legal framework of many countries because the legal framework is insufficiently flexible or insufficiently specific in regulating the new relations between business entities. The Internet commerce presents the following problems to the legal framework of states:

- **Distance transactions.** More often than ever before the buyer-seller relations are losing direct contact. On the Internet it may happen that neither party to

the transaction knows about the transaction until it is due to be performed, let alone have the written form of the transaction. New conditions and forms for the validity of transactions are necessary. It is also imperative to have means how to define the liability of the parties.

- **Payments.** New payment methods and means have emerged in the public environment of the wide world web. Almost every transaction of this kind involves, in addition to the buyer or seller, their banks and the operators of the payment systems, if any. Since the number of frauds through the use of electronic payment means is quite considerable these days, the liability of each party must be unambiguously defined.
- **International aspects.** Although electronic commerce does not recognize national borders, they are still recognized by commercial law. The existing specific legal acts, taxation rules and restrictions on imports and exports still remain an important, slow moving issue to lawyers
- **Consumer protection.** The population requires guarantees that the presentation of goods and services on the Internet should conform to their qualities that the buyer should be entitled to return the acquired defective product that the consumer should be protected against undesired advertising or against the improper use of his/her personal data.
- **Protection of trademarks, Internet and intellectual property.** The territory-bound character of law related to these forms of property runs counter to the realities of the cross-border nature of the Internet, while the digital form of many products distributed in the cyberspace is especially vulnerable to illegal copying.

4. Ethical Issues:

In general, many ethical and global issues of Information Technology apply to e-business. So, what are the issues particularly related to e-commerce? Let's list some of the ethical issues spawned with the growing field of e-commerce.

- **Web tracking.** E-businesses draw information on how visitors use a site through log files. Analysis of log file means turning log data into application service or installing software that can pluck relevant information from files in-house. Companies track individual's movement through tracking software and cookie analysis. Programs such as cookies raise a batch of privacy concerns.

The tracking history is stored on your PC's hard disk, and any time you revisit a website, the computer knows it. Many smart end users install programs such as Cookie cutters, Spam Butcher, etc. which can provide users some control over the cookies.

The battle between computer end users and web trackers is always going on with a range of application programs. For example, software such as Privacy Guardian, My Privacy, etc. can protect user's online privacy by erasing browser's cache, surfing history and cookies. To detect and remove spyware specially designed programs like Ad-Aware are present. A data miner application, SahAgent collects and combines Internet browsing history of users and sends it to servers. The battle goes on!

- **Privacy.** Most Electronic Payment Systems knows the identity of the buyer. So it is necessary to protect the identity of a buyer who uses Electronic Payment System. A privacy issue related to the employees of company is tracking. Monitoring systems are installed in many companies to monitor e-mail and other web activities in order to identify employees who extensively use business hours for non-business activities. The e-commerce activities performed by a buyer can be tracked by organizations. For example, reserving railway tickets for their personal journey purpose can be tracked. Many employees don't want to be under the monitoring system even while at work.

  As far as brokers and some of the company employees are concerned, E-Commerce puts them in danger zone and results in elimination from their jobs. The manner in which employees are treated may raise ethical issues, such as how to handle displacement and whether to offer retraining programs.

- **Disintermediation and Reintermediation.** Intermediation is one of the most important and interesting e-commerce issue related to loss of jobs. The services provided by intermediaries are:
  (i) Matching and providing information.
  (ii) Value added services such as consulting.

  The first type of service (matching and providing information) can be fully automated, and this service is likely to be in e-marketplaces and portals that provide free services. The value added service requires expertise and this can

only be partially automated. The phenomenon by which Intermediaries, who provide mainly matching and providing information services, are eliminated is called Disintermediation.

The brokers who provide value added services or who manage electronic intermediation (also known as infomediation), are not only surviving but may actually prosper, this phenomenon is called Reintermediation. The traditional sales channel will be negatively affected by disintermediation. The services required to support or complement e-commerce are provided by the web as new opportunities for reintermediation. The factors that should be considered here are the enormous number of participants, extensive information processing, delicate negotiations, etc. They need a computer mediator to be more predictable.

- **Legal Issues.** Where are the headlines about consumers defrauding merchants? What about fraud e-commerce websites? Internet fraud and its sophistication have grown even faster than the Internet itself. There is a chance of a crime over the internet when buyers and sellers do not know each other and cannot even see each other. During the first few years of e-commerce, the public witnessed many frauds committed over the internet. Let's discuss the legal issues specific to e-commerce.

- **Fraud on the Internet.** E-commerce fraud popped out with the rapid increase in popularity of websites. It is a hot issue for both cyber and click-and-mortar merchants. The swindlers are active mainly in the area of stocks. The small investors are lured by the promise of false profits by the stock promoters. Auctions are also conductive to fraud, by both sellers and buyers. The availability of e-mails and pop up ads has paved the way for financial criminals to have access to many people. Other areas of potential fraud include phantom business opportunities and bogus investments.

- **Copyright.** The copyright laws protect Intellectual property in its various forms, and cannot be used freely. It is very difficult to protect Intellectual property in E-Commerce. For example, if you buy software you have the right to use it and not the right to distribute it. The distribution rights are with the copyright holder. Also, copying contents from the website also violates copy right laws.

- **Domain Names.** The competition over domain names is another legal issue. Internet addresses are known as domain names and they appear in levels. A top level name is *qburst.com* or *microsoft.com*. A second level name will be *qburst.com/blog.* Top level domain names are assigned by a central non-profit organization which also checks for conflicts or possible infringement of trademarks. Problems arise when several companies having similar names competing over the same domain name. The problem of domain names was alleviated somewhat in 2001 after several upper level names were added to .com.

  Another issue to look out for is Cybersquatting, which refers to the practice of registering domain names with the desire of selling it at higher prices.

Security features such as authentication, non-repudiation and escrow services can protect the sellers in e-commerce.

5. Electronic Fund Transfers (EFTs):

Although the Web has made online shopping possible for many businesses and individuals, in a broader sense, electronic commerce has existed for many years. For more than 30 years, banks have been using electronic funds transfers (EFTs, also called wire transfers), which are electronic transmissions of account exchange information over private communications' networks.

6. Electronic Data Interchange (EDI):

Electronic data interchange (EDI) is the electronic exchange of business information—purchase orders, invoices, bills of lading, inventory data and various types of confirmations—between organizations or trading partners in standardized formats. EDI also is used within individual organizations to transfer data between different divisions or departments, including finance, purchasing and shipping. When the focus of EDI centers on payments, especially between banks and companies, the term financial EDI (FEDI) is sometimes used. Along with digital currency, electronic catalogs, intranets and extranets, EDI is a major cornerstone of e-commerce overall.

Two characteristics set EDI apart from other ways of exchanging information. First, EDI only involves business-to-business transactions; individual consumers do not directly use EDI to purchase goods or services. Secondly, EDI involves transactions between computers or databases, not individuals. Therefore, individuals sending e-mail messages or sharing files over a network does not constitute EDI.

What is EDI?

EDI refers to the exchange of data between one computer and another on a pre-defined structure where both have agreed upon the same message standard. This electronic communication helps in business transactions such as order, confirmation, shipping notices and so on between organizations. The relationship is usually developed between a vendor and a customer. EDI implies computer to computer transaction into vendor databases and ordering systems. The EDI system co-ordinates transaction, initiates deliveries and generates invoices. Data is exchanged between different companies using a network such as the Internet.

What are the essential elements of EDI?

Some of the essential elements of EDI are the use of an electronic transmission medium instead of physical storage such as magnetic tapes, and disks. The message is well structured and formatted. The exchange of documents from the sender to receiver speeds up. EDI enables direct communication between applications. It depends on a sophisticated information technology infrastructure that includes data processing, data management, networking capabilities that ensure efficient and reliable data transmission between remote sets.

How does EDI benefit industry?

There are numerous advantages of using EDI. Some of them are increased business opportunities in various sectors and reduction of workforce requirements. There's quick data transfer, less time is wasted on exception handling, it also saves time in unnecessary re-capture of data. It is also beneficial in areas such as inventory management, transportation and distribution, administration and cash management due to automatic existing process leading to cost reduction, improved speed and better quality of services. EDI is being used by Federal Express, Eastman Kodak, American Airlines, Nike, Staples, NationsBank etc.

What's the relationship between EDI and XML?

EDI is a widely used e-commerce technology whereas XML (Extensible Markup Language) is a good technology for business to exchange information. The existing EDI data format can easily be translated into XML. At some points, EDI blurs into XML-based e-commerce. It is easy to search data, decode, manipulate and display it in a consistent way.

How does EDI work?

EDI provides the electronic equivalent of common business documents—request for quotes, purchase orders and invoices—which are then transmitted electronically between computers of trading partners. Electronic documents are given standardized electronic format, as it is easy for everyone to correctly interpret information sent to them. Translation software is used by each partner to translate business data from ASCII (American Standard Code for Information Interchange) format or any other format to ANSI X12 form and vice versa.

What's the difference between e-commerce and EDI?

E-commerce and EDI differ. E-commerce is an aspect of doing electronic business, person to person interaction or collaboration, money transfer, data sharing and exchange, Web site merchant systems etc. EDI is a subset of e-commerce. In EDI, users can exchange business information in a standardized electronic form.

7. Value Chain and Supply Chain:

The production of goods and services is the result of the efforts of many organizations- a complex web of contracts and co-operation known as the supply chain or the value system. The structure of the value system varies greatly between business sectors and sometimes between different organizations within a sector. Each stage in the supply chain adds value; the interfaces between the stages require the exchange of information.

The **value chain** is a concept from business management that was first described and popularized by Michael Porter in his 1985; a value chain is a chain of activities for a firm operating in a specific industry. Products pass through all activities of the chain in order, and at each activity the product gains some value. The chain of activities gives the products more added value than the sum of the independent activity's

value. It is important not to mix the concept of the value chain with the costs occurring throughout the activities. A diamond cutter, as a profession, can be used to illustrate the difference of cost and the value chain. The cutting activity may have a low cost, but the activity adds much of the value to the end product, since a rough diamond is significantly less valuable than a cut diamond.

To bring the concept of value into focus, consider for a moment a person walking in the desert, a person who is dying of thirst. As that person walks they have one thing on their mind, and that is water. At that moment there is little consideration for the form of the water, the container, or who will be providing it. Water has a unique value to that person. When they find water, or they are offered some, money would be of little concern. *What is the point of this example?*

First is that value is a subjective experience that is dependent on context. In the context of a busboy clearing a table, a glass of water sitting there has no value, or even negative value – it's just more work for him. But for the man dying of thirst, that same glass of water is extremely valuable. *Second*, value occurs when needs are met through the provision of products, resources, or services – usually during some form of transaction or exchange. *Finally*, value is an experience, and it flows from the person (or institution) that is the recipient of resources – it flows from the customer. This is a key difference between a value chain and a supply chain – they flow in opposite directions.
There are three forms of value that occur in B2B commercial transactions:

- Technical (Resource Value);
- Organizational (Business Context); and
- Personal (Career and Idiosyncratic)

Technical value is intrinsic to the resource being provided and occurs in virtually all exchanges. For the thirsty man, the water has a technical value regardless of the source or any other consideration. The cup can be used or even dirty, the man providing it a criminal, and the water will still have the same technical value.

Organizational value is built upon the context of the exchange, and may derive from a range of factors such as ethical standards, prestige, reliability, and association. Brand image may build organizational value, as well as company reputation. When at a fine dining establishment, the label on the water bottle generates value far in excess of the bottle's content.

Personal value is derived from the personal experiences and relationships involved in the exchange of resources and the benefits provided. While technical and organizational value accrues to the firms involved in a commercial exchange, personal value accrues to the individual.

A **supply chain** is a system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resources, raw materials and components into a finished product that is delivered to the end customer. In sophisticated supply chain systems, used products may re-enter the supply chain at any point where residual value is recyclable. Supply chains links value chains.

We depict the Order Fulfillment Value Chain in Figure 6 as a pictorial of the comparison, with respect to a customer's viewpoint.

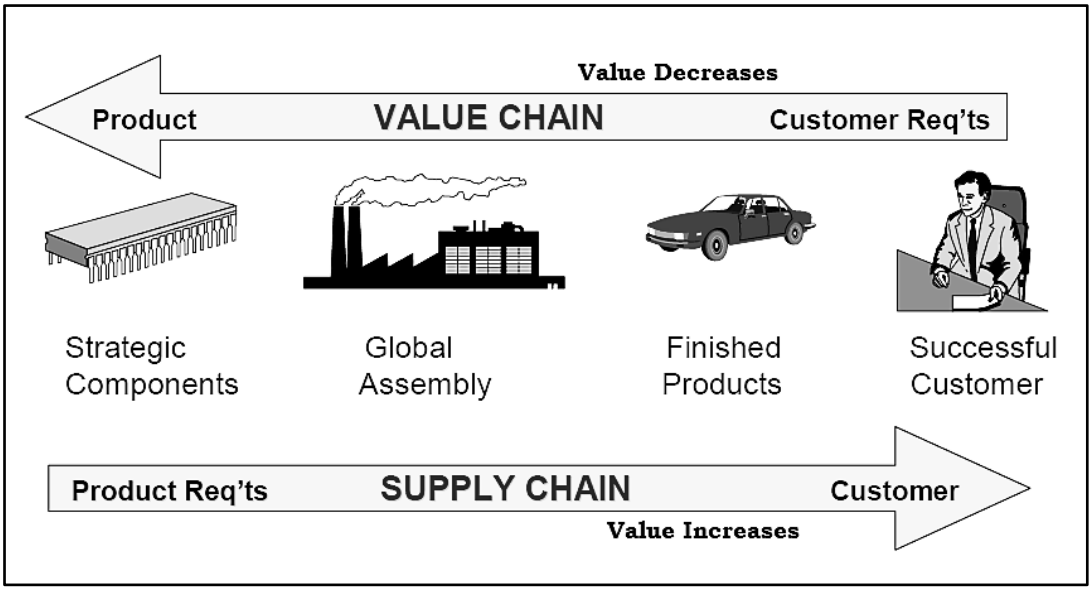

Fig 6. A Comparison of a Value Chain with a Supply Chain.

8. Advantages & Disadvantages of E-Commerce:

Advantages:

- Faster buying/selling procedure, as well as easy to find products.
- Buying/selling 24/7.
- More reach to customers, there is no theoretical geographic limitations.
- Low operational costs and better quality of services.
- No need of physical company set-ups.
- Easy to start and manage a business.
- Customers can easily select products from different providers without moving around physically.

Disadvantages:

- Any one, good or bad, can easily start a business. And there are many bad sites which eat up customers' money.
- There is no guarantee of product quality.
- Mechanical failures can cause unpredictable effects on the total processes.
- As there is minimum chance of direct customer to company interactions, customer loyalty is always on a check.
- There are many hackers who look for opportunities, and thus an ecommerce site, service, payment gateways; all are always prone to attack.

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UNIT- 2ND

Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

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1. Electronic- Payment Systems:

An e-commerce payment system facilitates the acceptance of electronic payment for online transactions. Also known as a sample of Electronic Data Interchange (EDI), e-commerce payment systems have become increasingly popular due to the widespread use of the internet-based shopping and banking. In the early years of B2C transactions, many consumers were apprehensive of using their credit and debit cards over the internet because of the perceived increased risk of fraud. Recent research shows that 90% of people in the United Kingdom still do not shop online because they do not trust online payment systems.

Payment Cards

Businesspeople often use the term payment card as a general term to describe all types of plastic cards that consumers (and some businesses) use to make purchases. The main categories of payment cards are credit cards, debit cards, and charge cards.

Credit Card: A **credit card** is a small plastic card issued to users as a system of payment. It allows its holder to buy goods and services based on the holder's promise to pay for these goods and services. The issuer of the card creates a revolving account and grants a line of credit to the consumer (or the user) from which the user can borrow money for payment to a merchant or as a cash advance to the user

A credit card, such as a Visa or a MasterCard, has a spending limit based on the user's credit history; a user can pay off the entire credit card balance or pay a minimum amount each billing period. Credit card issuers charge interest on any unpaid balance. Credit cards are widely accepted by merchants around the world and provide assurances for both the consumer and the merchant. A consumer is

protected by an automatic 30-day period in which he or she can dispute an online credit card purchase. Merchants that already accept credit cards in an offline store can accept them immediately for online payment because they already have established a mechanism for accepting credit card payments. Online credit card purchases are similar to telephone purchases in that the card holder is not present and cannot provide proof of identity as easily as he or she can when standing at the cash register. Online and telephone purchases are often called card not present transactions and both include an extra degree of risk for merchants and banks.

Debit Card: A **debit card** (also known as a **bank card** or **check card**) is a plastic card that provides the cardholder electronic access to his or her bank account/s at a financial institution. Some cards have a stored value with which a payment is made, while most relay a message to the cardholder's bank to withdraw funds from a designated account in favor of the payee's designated bank account. The card can be used as an alternative payment method to cash when making purchases. In some cases, the cards are designed exclusively for use on the Internet, and so there is no physical card.

A debit card looks like a credit card, but it works quite differently. Instead of charging purchases against a credit line, a debit card removes the amount of the sale from the cardholder’s bank account and transfers it to the seller’s bank account. Debit cards are issued by the cardholder’s bank and usually carry the name of a major credit card issuer, such as Visa or MasterCard, by agreement between the issuing bank and the credit card issuer. By branding their debit cards (with the Visa or MasterCard name), banks ensure that their debit cards will be accepted by merchants who recognize the credit card brand names. In many countries the use of debit cards has become so widespread that their volume of use has overtaken or entirely replaced the check and, in some instances, cash transactions. Like credit cards, debit cards are used widely for telephone and Internet purchases.

However, unlike credit cards, the funds paid using a debit card are transferred immediately from the bearer's bank account, instead of having the bearer pay back the money at a later date.

Smart Card: A **smart card**, **chip card**, or **integrated circuit card** (**ICC**), is any pocket-sized card with embedded integrated circuits. A smart card or microprocessor cards contain volatile memory and microprocessor components. The card is made of plastic, generally polyvinyl chloride. Smart cards may also provide strong security authentication for single sign-on (SSO) within large organizations.

The benefits of smart cards are directly related to the volume of information and applications that are programmed for use on a card. A single contact/contactless smart card can be programmed with multiple banking credentials, medical entitlement, driver's license/public transport entitlement, loyalty programs and club memberships to name just a few. Multi-factor and proximity authentication can and has been embedded into smart cards to increase the security of all services on the card. For example, a smart card can be programmed to only allow a contactless transaction if it is also within range of another device like a uniquely paired mobile phone. This can significantly increase the security of the smart card.

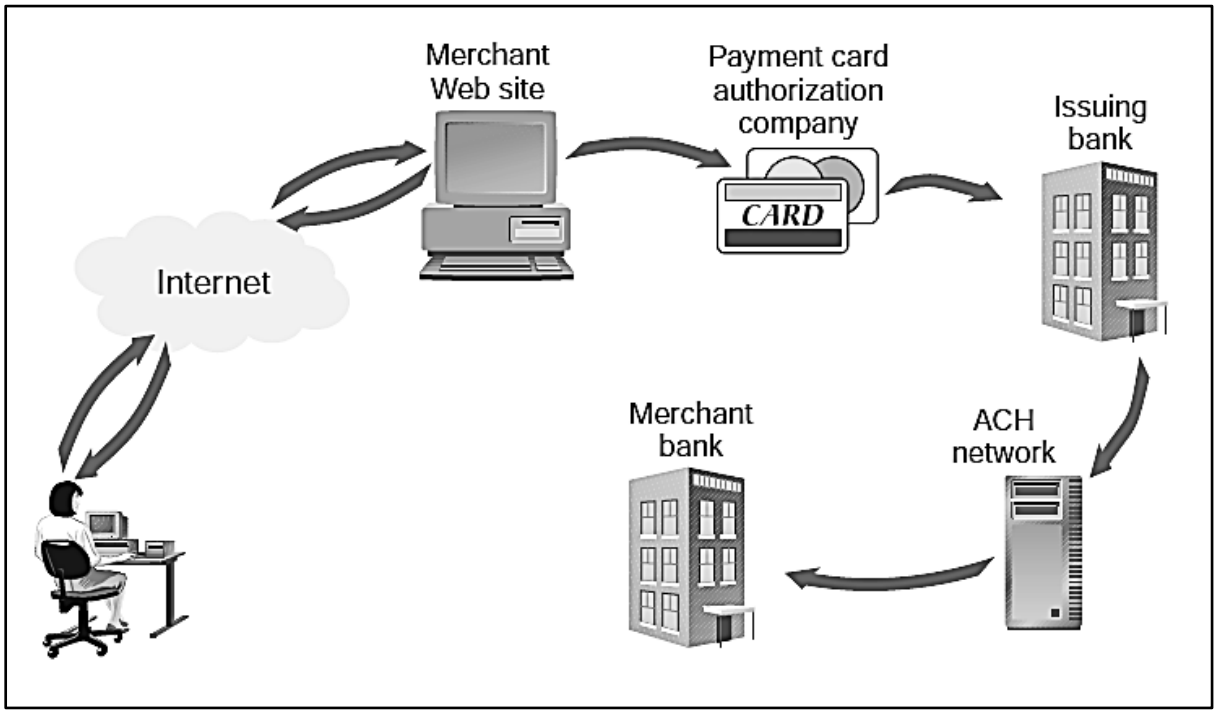

Fig 1. Processing a Payment Card Transaction.

Advantages and Disadvantages of Payment Cards:

Many businesses accept payment by card for their goods and services and this can undoubtedly offer some distinct advantages. However, there are potential drawbacks that should be considered.

Advantages

- Responding to customer preferences - people expect to be able to pay by card.
- Encouraging impulse purchases - the customer doesn't need to have cash with them.
- Avoiding lost sales opportunities - if a customer leaves to get cash they may not return.
- Reaching a wider customer base - you can accept payment by phone, mail and online from customers who can't reach your premises.
- Cashflow improvements - card payments usually clear more quickly than cheques, although this depends on your merchant agreement. Funds can take up to four working days to reach a business' bank account for face-to-face sales - this may be different for online sales.
- Improved security - you hold less cash on your premises.
- Easing your admin - a regular statement of card transactions is easier to reconcile than numerous cash transactions.
- Cards can be used internationally and currency conversions are handled automatically - they're an important payment method for tourist-sector businesses or those selling to consumers overseas.
- With card payments, the customer's card is checked to see if it is valid and that it hasn't been reported lost or stolen. In addition, in a majority of cases, the customer's account is checked to ensure the funds are available. In most cases, an authorization for the payment is given. However, a card authorization does not guarantee that the payment will not be charged back in the future.

Disadvantages

- Accepting cards can increase your exposure to fraud. Chargebacks can occur when a customer disputes a card transaction. Your bank can transfer liability to you and reclaim the value of the transaction from your account.
- To accept and process certain major charge cards - including American Express and Diners Club - you must reach a separate agreement with the charge-card company.
- You will need to train staff, both in the technical and administrative issues, as well as in fraud prevention measures.

Note: I didn’t find any matter on ‘e-Credit Account’, if anyone has then kindly mail it to ‘dhyansingh123@gmail.com’.

Electronic- Money: (also known as **e-currency**, **e-money**, **electronic cash**, **electronic currency**, **digital money**, **digital cash**, **digital currency**, **cyber currency**) refers to money which is only exchanged electronically. Typically, this involves the use of computer networks, the internet and digital stored value systems. Electronic Funds Transfer (EFT), direct deposit, digital gold currency and virtual currency are all examples of electronic money.

Electronic cash is a general term that describes any value storage and exchange system created by a private (nongovernmental) entity that does not use paper documents or coins and that can serve as a substitute for government-issued physical currency. A significant difference between electronic cash and scrip is that electronic cash can be readily exchanged for physical cash on demand. Because electronic cash is issued by private entities, there is a need for common standards among all electronic cash issuers so that one issuer's electronic cash can be accepted by another issuer. This need has not yet been met. Each issuer has its own standards and electronic cash is not universally accepted, as is government-issued physical currency.

A number of electronic money systems use contactless payment transfer in order to facilitate easy payment and give the payee more confidence in not letting go of their electronic wallet during the transaction. Electronic cash shows particular promise in two applications: the sale of goods and services priced less than $10—the lower threshold for credit card payments—and the sale of all goods and services to those persons without credit cards.

Advantages and Disadvantages of Electronic- Cash

Advantages

- We can transfer funds, purchase stocks, and offer a variety of other services without having to handle physical cash or checks as long as bank is providing such services online. The significant effect is we do not have to queue in lines.
- Debit cards and online bill payments allow immediate transfer of funds from an individual's personal account to a business's account regardless the designated place (around the globe) by few clicks without any actual paper transfer of money. This bring convenience individual like us and businessmen.
- Consumers will have greater privacy when shopping on the Internet using electronic money instead of ordinary credit cards.

Disadvantages

- E-cash and E-Cash transaction security are the major concern. Frauds on E-Cash are on the catch recent years. Hackers with good skill able to hack into bank accounts and illegally retrieve of banking records has led to a widespread invasion of privacy and has promoted identity theft. There are many other tricks including through phishing website of certain banks and emails.
- Money flow and criminal/terrorist activities are harder to be traced by government. With the continued growth of E-Cash, money flow in and out of countries at immediate speed without being traced will weaken the government's ability to monitor and income in tax. Money laundering and tax evasion could be uncontrollable in e-cash systems as criminals use untraceable internet transaction to hide assets offshore.
- E-Cash is not for everyone. Low income groups without computer and internet access are unable to enjoy the usage of E-Cash. This issue shall be resolved so that E-Cash could be implemented widely.
- There is also a pressing issue regarding the technology involved in electronic cash such power failures, internet connection failure, loss of records and undependable software. These often cause a major setback in promoting the technology.

2. Marketing on the Web:

Internet marketing, also known as **digital marketing**, **web marketing**, **online marketing**, **search marketing** or **e-marketing**, is referred to as the marketing (generally promotion) of products or services over the Internet. iMarketing is used as an abbreviated form for Internet Marketing.

Internet marketing is considered to be broad in scope because it not only refers to marketing on the Internet, but also includes marketing done via e-mail and wireless media. Digital customer data and electronic customer relationship management (ECRM) systems are also often grouped together under internet marketing.

Internet marketing ties together the creative and technical aspects of the Internet, including design, development, advertising, and sales. Internet marketing also refers to the placement of media along many different stages of the customer engagement cycle through search engine marketing (SEM), search engine optimization (SEO),

banner ads on specific websites, email marketing, mobile advertising, and Web 2.0 strategies.

Advantages

Internet marketing is inexpensive when examining the ratio of cost to the reach of the target audience. Companies can reach a wide audience for a small fraction of traditional advertising budgets. The nature of the medium allows consumers to research and to purchase products and services conveniently. Therefore, businesses have the advantage of appealing to consumers in a medium that can bring results quickly. The strategy and overall effectiveness of marketing campaigns depend on business goals and cost-volume-profit (CVP) analysis.

Internet marketers also have the advantage of measuring statistics easily and inexpensively; almost all aspects of an Internet marketing campaign can be traced, measured, and tested, in many cases through the use of an ad server. The advertisers can use a variety of methods, such as pay per impression, pay per click, pay per play, and pay per action. Therefore, marketers can determine which messages or offerings are more appealing to the audience. The results of campaigns can be measured and tracked immediately because online marketing initiatives usually require users to click on an advertisement, to visit a website, and to perform a targeted action.

3. Marketing Strategies:

Marketing strategy is a process that can allow an organization to concentrate its limited resources on the greatest opportunities to increase sales and achieve a sustainable competitive advantage.

Developing a Marketing Strategy

Marketing strategies serve as the fundamental underpinning of marketing plans designed to fill market needs and reach marketing objectives. Plans and objectives are generally tested for measurable results. Commonly, marketing strategies are developed as multi-year plans, with a tactical plan detailing specific actions to be accomplished in the current year. Time horizons covered by the marketing plan vary by company, by industry, and by nation, however, time horizons are becoming shorter as the speed of change in the environment increases. Marketing strategies are dynamic and interactive. They are partially planned and partially unplanned.

Marketing strategy involves careful scanning of the internal and external environments. Internal environmental factors include the marketing mix, plus performance analysis and strategic constraints. External environmental factors include customer analysis, competitor analysis, target market analysis, as well as evaluation of any elements of the technological, economic, cultural or political/legal environment likely to impact success. A key component of marketing strategy is often to keep marketing in line with a company's overarching mission statement. Besides SWOT analysis, portfolio analyses such as the GE/McKinsey matrix or COPE analysis can be performed to determine the strategic focus.

Once a thorough environmental scan is complete, a strategic plan can be constructed to identify business alternatives, establish challenging goals, determine the optimal marketing mix to attain these goals, and detail implementation. A final step in developing a marketing strategy is to create a plan to monitor progress and a set of contingencies if problems arise in the implementation of the plan.

Types of Strategies

Marketing strategies may differ depending on the unique situation of the individual business. However there are a number of ways of categorizing some generic strategies. A brief description of the most common categorizing schemes is presented below:

- *Strategies based on market dominance* - In this scheme, firms are classified based on their market share or dominance of an industry. Typically there are four types of market dominance strategies:
    - Leader
    - Challenger
    - Follower
    - Nicher
- *Porter generic strategies* - strategy on the dimensions of strategic scope and strategic strength. Strategic scope refers to the market penetration while strategic strength refers to the firm’s sustainable competitive advantage. The generic strategy framework (porter 1984) comprises two alternatives each with two alternative scopes. These are *Differentiation* and *low-cost leadership* each with a dimension of *Focus*-broad or narrow.
    - Product differentiation (broad)
    - Cost leadership (broad)
    - Market segmentation (narrow)

- *Innovation strategies* - this deals with the firm's rate of the new product development and business model innovation. It asks whether the company is on the cutting edge of technology and business innovation. There are three types:
    - Pioneers
    - Close followers
    - Late followers
- *Growth strategies* - In this scheme we ask the question, “How should the firm grow?” There are a number of different ways of answering that question, but the most common gives four answers:
    - Horizontal integration
    - Vertical integration
    - Diversification
    - Intensification

Strategic Models

Marketing participants often employ strategic models and tools to analyze marketing decisions. When beginning a strategic analysis, the 3Cs (Corporation, Customer & Competitors) can be employed to get a broad understanding of the strategic environment. An Ansoff Matrix is also often used to convey an organization's strategic positioning of their marketing mix. The 4Ps (Product, Price, Promotion & Place) can then be utilized to form a marketing plan to pursue a defined strategy.

There are many companies especially those in the Consumer Package Goods (CPG) market that adopt the theory of running their business centered around Consumers, Shopper & Retailer needs. Their Marketing departments spend quality time looking for "Growth Opportunities" in their categories by identifying relevant insights (both mindsets and behaviors) on their target Consumers, Shoppers and retail partners. These Growth Opportunities emerge from changes in market trends, segment dynamics changing and also internal brand or operational business challenges.

Real-life Marketing

Real-life marketing primarily revolves around the application of a great deal of common-sense; dealing with a limited number of factors, in an environment of imperfect information and limited resources complicated by uncertainty and tight

timescales. Use of classical marketing techniques, in these circumstances, is inevitably partial and uneven.

Thus, for example, many new products will emerge from irrational processes and the rational development process may be used (if at all) to screen out the worst non-runners. The design of the advertising, and the packaging, will be the output of the creative minds employed; which management will then screen, often by 'gut-reaction', to ensure that it is reasonable.

For most of their time; marketing managers use intuition and experience to analyze and handle the complex, and unique, situations being faced.

4. Advertising on the Web:

Online advertising is a form of promotion that uses the Internet and World Wide Web to deliver marketing messages to attract customers. Examples of online advertising include contextual ads on search engine results pages, banner ads, Rich Media Ads, Social network advertising, interstitial ads, online classified advertising, advertising networks and e-mail marketing, including e-mail spam. Many of these types of ads are delivered by an Ad server.

Competitive Advantage over Traditional Advertising:

One major benefit of online advertising is the immediate publishing of information and content that is not limited by geography or time. To that end, the emerging area of interactive advertising presents fresh challenges for advertisers who have hitherto adopted an interruptive strategy.

Another benefit is the efficiency of advertiser's investment. Online advertising allows for the customization of advertisements, including content and posted websites. For example, AdWords, Yahoo! Search Marketing and Google AdSense enable ads to be shown on relevant web pages or alongside search result.

Online Advertisement

The internet has become an ongoing emerging source that tends to expand more and more. The growth of this particular media attracts the attention of advertisers as a more productive source to bring in consumers.

A clear advantage consumers have with online advertisement is the control they have over the item, choosing whether to check it out or not.

Online advertisements may also offer various forms of animation. In its most common use, the term "online advertising" comprises all sorts of banner, e-mail, in-game, and keyword advertising, on platforms such as Facebook, Twitter, or Myspace has received increased relevance. Web-87related advertising has a variety of sites to publicize and reach a niche audience to focus its attention to a specific group. Research has proven that online advertising has given results and is growing business revenue. For the year 2012; Jupiter research predicted $34.5 billion in US online advertising spending.

5. Customer Service and Support (CSS):

Customer service and support (CSS) is the part of a company's customer relationship management (CRM) department that interacts with a customer for their immediate benefit, including components such as the contact center, the help desk, and the call management system.

Customer Service

Customer service is the provision of services to customers before, during and after a purchase. According to Turban et al. (2002), “Customer service is a series of activities designed to enhance the level of customer satisfaction – that is, the feeling that a product or service has met the customer expectation."

Its importance varies by products, industry and customer; defective or broken merchandise can be exchanged, often only with a receipt and within a specified time frame. Retail stores often have a desk or counter devoted to dealing with returns, exchanges and complaints, or will perform related functions at the point of sale.
From the point of view of an overall sales process engineering effort, customer service plays an important role in an organization's ability to generate income and revenue. From that perspective, customer service should be included as part of an overall approach to systematic improvement. A customer service experience can change the entire perception a customer has of the organization. Customer service, especially in the shape of a call-center - is to customers one of the most visible and significant aspects of organizational performance.

Customer Support

Customer support is a range of customer services to assist customers in making cost effective and correct use of a product. It includes assistance in planning, installation, training, trouble shooting, maintenance, upgrading, and disposal of a product. Regarding technology products such as mobile phones, televisions, computers, software products or other electronic or mechanical goods, it is termed technical support.

Customer Relationship Management (CRM)

Customer relationship management (CRM) is a widely implemented strategy for managing a company's interactions with customers, clients and sales prospects. It involves using technology to organize, automate, and synchronize business processes—principally sales activities, but also those for marketing, customer service, and technical support. The overall goals are to find, attract, and win new clients, nurture and retain those the company already has, entice former clients back into the fold, and reduce the costs of marketing and client service. Customer relationship management describes a company-wide business strategy including customer-interface departments as well as other departments. Measuring and valuing customer relationships is critical to implementing this strategy.

Automated Customer Service (ACS)

Customer service may be provided by a person (e.g., sales and service representative), or by automated means. Examples of automated means are Internet sites. An advantage with automated means is an increased ability to provide service 24-hours a day, which can, at least, be a complement to customer service by persons.

Automated means can be based entirely on self-service, but may also be based on service by more or less means of artificial intelligence. Examples of customer service by artificial means are automated online assistants that can be seen as avatars on websites. It can avail for enterprises to reduce their operating and training cost. These are driven by chatterbots, and a major underlying technology to such systems is natural language processing.

Benefits of Effective Customer Service

The central aim of effective customer service and call-centers is retaining customers, but when an organization gets this right the acquisition of new customers - and so many other things - automatically becomes much easier too.

Retaining customers - enabled by excellent customer service - produces many positive benefits for the organization aside from the obvious revenue and profit results:

- Retaining customers through effective customer service enables easier growth, indirectly and directly, for example by sustaining healthier volumes and margins, and by business expansion from word-of-mouth referrals.
- A high level of customer retention via effective customer service also improves staff morale and motivation. No-one enjoys working for an organization that feels like a sinking ship, or where stressful arguments or pressures prevail. When customers are happy, all the staff are happier too - and more productive.
- Improved staff morale and motivation resulting from reducing customer attrition also positively benefits staff retention and turnover, recruitment quality and costs, stress, grievance, discipline and counseling pressures.
- Reduced customer attrition and upset naturally reduces litigation and legal problems, from customers or fair trading laws.
- Retaining customers also enables the whole organization- especially middle-managers- to focus more on proactive opportunities (growth, innovation, development, etc.) rather than reactive fire-fighting, crisis management, failure analysis, and the negative high pressures to win replacement business.
- Having a culture of delighting and retaining customers fuels positive publicity and reputation in the media, and increasingly on the web in blogs and forums, etc. The converse applies of course, when nowadays just one disgruntled customer and a reasonable network of web friends can easily cause a significant public relations headache.

6. Introduction to m- Commerce (Mobile- Commerce):

Mobile Commerce refers to wireless electronic commerce used for conducting commerce or business through a handy device like cellular phone or Personal Digital Assistant (PDAs). It is also said that it is the next generation wireless e-commerce that needs no wire and plug-in devices. Mobile commerce is usually called as 'm-Commerce' in which user can do any sort of transaction including buying and selling of the goods, asking any services, transferring the ownership or rights, transacting and transferring the money by accessing wireless internet service on the mobile handset itself.

The next generation of commerce would most probably be mobile commerce or m-commerce. Presuming its wide potential reach all major mobile handset manufacturing companies are making WAP enabled smart phones and providing the maximum wireless internet and web facilities covering personal, official and commerce requirement to pave the way of m-commerce that would later be very fruitful for them.

Advantages of m-Commerce:

M-commerce has several major advantages over its fixed counterparts because of its specific inbuilt characteristics such as ubiquity, personalization, flexibility, and distribution, mobile commerce promises exceptional business market potential, greater efficiency and higher fruitfulness.

Thus it is not surprising that mobile commerce is emerging much faster than its fixed counterpart. M-commerce is more personalized than e-commerce and thus needs a gentle approach to appraise m-commerce applications.

Areas / Uses of m-commerce:

In the current commerce industry, mobile commerce or M-Commerce has been entered in finance, services, retails, telecommunication and information technology services. In these sectors, M-Commerce is not only being widely accepted but also it is being more used as a popular way of business/ commerce.

- **Finance Sectors.** Mobile Commerce works vastly in finance sector including all big and major financial institutes, banks, stock market and share brokers. Whenever any user needs money or wants any sort of banking and finance related services, he/she can access the services or register services via voice calling or via Short Message Services (SMS) services. WAP based mobile handsets allow the user to access the official website of the institute.

  User can transact money or transfer money, or pay the bill from its bank account using mobile commerce facilities. Banks also provide round the clock customer care services, which can be used any time through voice calling. Some customer care services are also provides non-voice services on mobile that is known as insta-alert facility. While in the stock market, the user can access the stock market quotes and get in live touch with current trading status on its mobile in two forms either voice (customer assistance) or non-

voice (sms alerts) or both. The share broker sends market trends and tips of trading on their clients' mobile. Also broker can suggest the appropriate stock for intra-day trading to their users.

- **Telecommunication Sectors.** Mobile has played a giant role in communication technology through its versatility and superiority. The ubiquity and easy usage has further made it extremely popular across the globe. It has already surpassed the fixed phone in the world. Software platform is essential for operating any mobile and this tool has revolutionized the communication world because of its functioning as a small computer.

  The booming popularity has forced the corporate world to develop a new commerce platform that can reach to masses. Mobile commerce has attracted massive traffic because of its unique characteristics. The user can change the service of any financial institute or banks if gets better product and service or user is unsatisfied with the service of the subscribing company. Besides this several bills can be paid using mobile and user can also check the available balance, the status of cheques, and the status of requested processing and customer care support.

- **Service/Retail Sectors.** Service and Retail sectors are also among the leading sectors, which have nurtured most from mobile commerce. M-Commerce has proved a major boon for these sectors. Several business dealings no matter how big or small are being finalized on the mobile phone. Customer would be able to book the order, can hire carrier/courier services and above all could also pay the dues related to it through mobile.

- **Information Sectors.** After the bursting of dotcom bubble, e-commerce has gone downwards to hell. But the evolution of mobile commerce has again worked as ambrosia for them. A separate sector has been evolved to exercise on this field for the IT experts. The webmasters have skillfully exploited this new area of IT-enabled commerce. In the IT field, mobile commerce has been used massively to deliver financial news, stock updates, sports figures and traffic updates and many more onto a single handheld device 'mobile'.

7. Case Study: E-commerce in Passenger Air Transport:

Introduction

Passenger air transport was one of the early users of e-Commerce, in this case electronic markets. Early innovations of airline booking systems, such as United and American Airlines, gained competitive advantage from the deployment of their systems and, even after the elimination of various anti-competitive features, continued to gain significant business value. The use of airline booking systems by travel agents gave access to a wealth of information and was an important element in creating what is now a fiercely competitive market in air travel.

With the advent of Internet e-Commerce, the air transport industry is again at the forefront of e-Commerce developments with each of the larger airlines providing for on-line bookings and, in many cases, linking this into their frequent flyer programs and electronic check-in facilities at the airport.

The Internet e-Commerce developments have the potential to, once again, restructure the market. A move away from the direct use of airline booking systems could de-emphasize price competition. A shift to direct on-line booking also threatens the role of the travel agent as an intermediary but possibly opens the market for a new breed of on-line intermediaries.

The major steps involved in booking a seat in an airline are as:

1. Select a trip and some dates. The trip should be substantial, across Atlantic or across Pacific and should be from one major airline hub to another (so that there will be several competing carriers); examples could be Kuala Lumpur to New York or San Francisco to Tokyo. The dates should be two or three months hence for, say, Christmas or 25 December to 02 March.
2. Use the web to find out a list of carriers that fly the required route.
3. Use the web sites of two or three selected airlines to find the cheapest available return flight.
4. Find an online travel agent and find the cheapest price from that agent for the requirements.

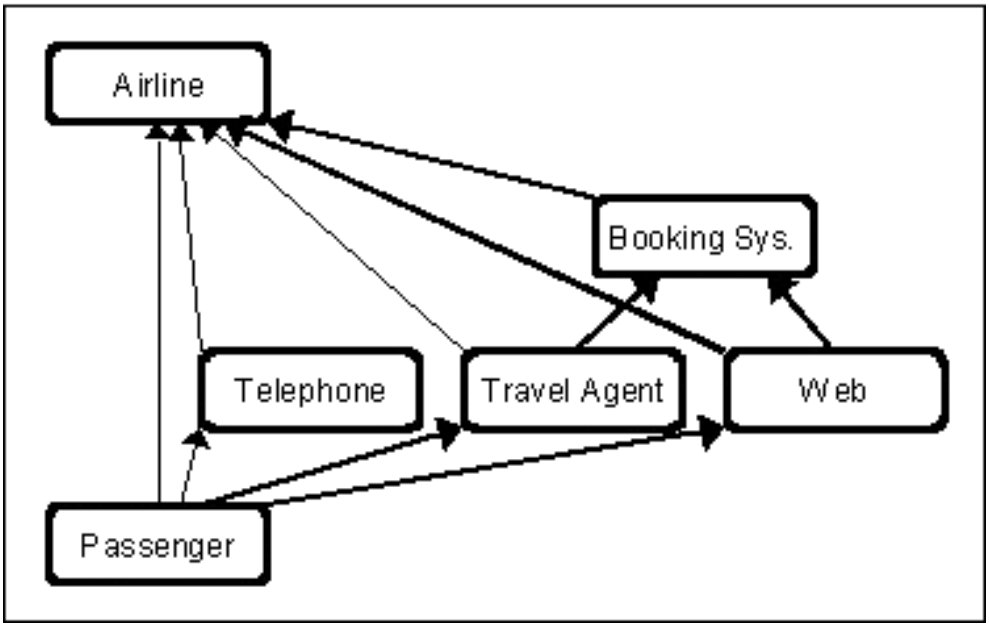

Fig 2. E-commerce in Passenger Air Transport.

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UNIT- 3RD

E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

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1. E- Government:

E-Government (short for electronic government, also known as **e-gov**, **digital government**, **online government**, or **connected government**) is digital interactions between a government and citizens (G2C), government and businesses/Commerce (G2B), government and employees, and also between government and governments /agencies (G2G). Essentially, the e-Government delivery models can be briefly summed up as (Jeong, 2007):

- G2C (Government to Citizens)
- G2B (Government to Businesses)
- G2E (Government to Employees)
- G2G (Government to Governments)

This digital interaction consists of governance, information and communication technology (ICT), business process re-engineering (BPR), and e-citizen at all levels of government (city, state/province, national, and international).

Defining e- Government

'E-Government' (or Digital Government) is defined as 'The employment of the Internet and the world-wide-web for delivering government information and services to the citizens.' (United Nations, 2006; AOEMA, 2005).

E-government describes the use of technologies to facilitate the operation of government and the disbursement of government information and services. E-government, short for electronic government, deals heavily with Internet and non-internet applications to aid in governments. E-government includes the use of electronics in government as large-scale as the use of telephones and fax machines,

as well as surveillance systems, tracking systems such as RFID tags, and even the use of television and radios to provide government-related information and services to the citizens.

Examples of e- Government and e- Governance

E-Government should enable anyone visiting a city website to communicate and interact with city employees via the Internet with graphical user interfaces (GUI), instant-messaging (IM), audio/video presentations, and in any way more sophisticated than a simple email letter to the address provided at the site" and "the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees". The focus should be on:

- The use of Information and communication technologies, and particularly the Internet, as a tool to achieve better government.
- The use of information and communication technologies in all facets of the operations of a government organization.
- The continuous optimization of service delivery, constituency participation and governance by transforming internal and external relationships through technology, the Internet and new media.

Whilst e-Government has traditionally been understood as being centered around the operations of government, e-Governance is understood to extend the scope by including citizen engagement and participation in governance. As such, following in line with the OECD definition of e-Government, e-Governance can be defined as the use of ICTs as a tool to achieve better governance.

Delivery Models and Activities of e- Government

The primary delivery models of e-Government can be divided into:

- **Government-to-Citizen** or **Government-to-Consumer (G2C):**
  - In this model, the G2C model applies the strategy of Customer Relationship Management (CRM) with business concept.
  - By managing their customer (citizen) relationship, the business (government) can provide the needed products and services fulfill the needs from customer (citizen).
- Government-to-Business (G2B)
- Government-to-Government (G2G)
- Government-to-Employees (G2E)

Within each of these interaction domains, four kinds of activities take place:

- Pushing information over the Internet, e.g.: regulatory services, general holidays, public hearing schedules, issue briefs, notifications, etc.
- Two-way communications between the agency and the citizen, a business, or another government agency. In this model, users can engage in dialogue with agencies and post problems, comments, or requests to the agency.
- Conducting transactions, e.g.: lodging tax returns, applying for services and grants.
- Governance, e.g.: To enable the citizen transition from passive information access to active citizen participation by:
    1. Informing the citizen
    2. Representing the citizen
    3. Encouraging the citizen to vote
    4. Consulting the citizen
    5. Involving the citizen

2. Theoretical Background of e- Governance:

e- Governance: An Overview

E-governance is a form of 'e-business' in governance comprising of processes and structures involved in deliverance of electronic services to the public, viz. citizens. It also involves collaborating with business partners of the government by conducting electronic transactions with them. Besides, it entails enabling the general public to interact with the government, through electronic means, for getting the desired services. In other words, c-governance2 means application of electronic means in the interaction between:

1. Government (G) and citizens (C), both ways (i.e. G2C and C2G),
2. Government or businesses (B), both ways (i.e. G2B and B2G), and
3. Internal government operation (G2G).

The aim, ultimately, is to simplify and improve governance and enable people's participation in governance through mail, and Internet. E-governance is much more than just preparing some websites. It ranges from the use of Internet for the dissemination of plain web based information at its simplest level to services and online transactions on the one hand and utilizing IT in the democratic process itself, i.e. election on the other.

E-governance implies e-democracy (Backers 2001), wherein all forms of interaction between the electorate (i.e. general public) and the elected (i.e. the government) is performed electronically. E-government, as distinguished from c-governance, comprises a pragmatic application and usage of the most innovative technologies in computer and communication technologies, including Internet technology, for delivering efficient and cost effective services, and information and knowledge to the citizens being governed, there by realizing the vast potential of the government to serve the citizens.

Various manifestations of e-governance initiative will be in terms of the government delivering services to citizens of transacting business, offering general information, or conducting interactions with the general public and business using such IT tools as:

- E-mail
- Internet web sites publishing (including online interactive transaction)
- WAP application and publishing
- SMS connectivity
- Intranet development and usage
- Promotion of citizen access.

3. Issues in e- Governance Applications:

- **Funding.** Funding is the foremost issue in e-Governance initiatives. The projects that are part of the e-governance initiatives need to be funded either through the Government sector or through the private sector. For the private sector to step into the funding activity their commercial interests needs to be ensured. The projects can be built either on BOO (Built Own Operate) or BOOT (Built Own Operate Transfer) basis. Also the Government interest of Value Addition in services also needs to be taken care of while transferring the services to private sector. Advertising, sharing of Government information etc. could be a few revenue generators for the Government.

- **Privacy.** The privacy of the citizen also needs to be ensured while addressing the issues. Whenever a citizen gets into any transaction with a Government agency, he shells out lot of personal information, which can be misused by the private sector. Thus, the citizen should be ensured that the information flow would pass through reliable channels and seamless network.

- **Authentication.** Secured ways of transactions for the Government services are another issue of concern. The identity of citizens requesting services needs to be verified before they access or use the services. Here digital signature will play an important role in delivery of such services. But the infrastructure needed to support them is very expensive and requires constant maintenance. Hence a pertinent need still survives, compelling the authorities to ensure the authenticity in their transactions thereby gaining absolute trust and confidence of the citizen.

- **Interoperability.** A major design issue for integrated service delivery sites is how to capture data in a Web-based form and transfer it to an agency's systems for processing and sharing that information in a common format. In fact the interoperation of various state Governments, the various ministries within a state Government is a critical issue. Further how the various islands of automation will be brought together and built into one is another key issue of e-Governance.

- **Delivery of services:** The ability of citizens to access these services is another major issue. Since the penetration of PCs and Internet is very low in the country, some framework needs to be worked out for delivery of the e-Services that would be accessible to the poorest of the poor. What will be the Government's network to deliver those services? Could we have something like a single stop shop of the Government? A proposed mechanism is delivery of the same through the Government Post Offices, for they already have the brick and mortar support and the most extensive network in the nation.

- **Standardization.** Defining the standards for the various Government services is another issue that needs to be addressed. The standards need to be worked out not only for the technologies involved but also for issues like naming of websites to creating E-Mail addresses.

- **Technology Issues.** A number of organizations, both in the Centre and the States, have taken commendable initiatives to develop hardware and software platforms to address the challenges offered by e-Governance. At the central level in particular, the C-DAC, CMC and a number of others are noteworthy. The e-Governance initiative would have to address these Technology Issues/Objectives by identifying the appropriate hardware platforms and

software application packages for cost-effective delivery of public services. This knowledge repository should be widely available through appropriate Demo-Mechanisms. Offering a basket of these models to the State departments, both in the Center and the State, could be suitably customized as per location and work specific requirements.

- **Use of local languages.** The access of information must be permitted in the language most comfortable to the public user, generally the local language. There do already exist technologies such as GIST and language software by which transliteration from English into other languages can be made.

- **Illiteracy:** Literacy rate is around 60% and rest 40% are dependent on farming, labor works and can't even read or write and hence the online activities are not in approach of the illiterate public.

- **Corruption:** Improper utilization of funds, Corruption, favoritism, unnecessary involvement or negligence of officials and political leaders is hampering the growth of G2C implementation.

- **Telecom Problems**: The infrastructure of telecommunication services are to be developed and existing system should be improved with advancements like ubiquitous, broad band and other future technologies.

- **Unaffordable Cost:** The cost of telecom and internet activities is not within the reach of general public. Lack of financial elements like affordability with public, telecom rationing system, free browsing centers etc. is limiting the progress.

4. Evolution of e- Governance, its Scope and Content:

Even though historically it was Chile which implemented real e-governance solution as early as the seventies, the current interest and attention on e-governance applications all over the world has its roots in the "Information Super Highway" concept initiated by the US Vice President Al Gore in early 1990s. The Information Super Highway was defined largely in terms of the information infrastructure at the national level by many countries including the US, UK, Canada, Australia and India. The focus was then largely on development of components of the infrastructure,

such as fibre optic networks across the States or Nations. Subsequently, the interest was widened to include socio-economic considerations encapsulated in the concept of Information Society or Knowledge Society, which naturally has to encompass e-governance.

That is how e-governance concept came into being in a formalized and focussed manner, even though attempts to implement Information Systems in the government departments and other public organizations have been made with partial success in various countries including India. Such earlier attempts did not receive the state patronage on a broad-based manner while individual or stray attempts may be cited to have succeeded.

Examples can be cited for typical information systems that run the 'back offices' in the financial and other sectors of business and industry. In fact, such 'back office' computerization could be even handled offshore in developing countries like India, where the skilled software manpower and also unskilled operational manpower have been available at low cost. The cost-effective satellite communication infrastructure facilitated such remote development and maintenance of software of these banking, financial, aviation and industrial sectors. This formed the bulk of the 'software exports' activity in countries such as India, Ireland, Israel, and China. Similarly, in 1990s and 2000 till now, the IT enabled services (ITES) formed the major component of remote services such as call centres, data entry, etc. However, as indicated earlier, all these activities were not concerned with c-governance. Governments were the last in the bandwagon of institutions attempting to harness ICT in their activities. However, though late, the governments all over the world finally woke up to realize the potential of ICT in all their activities.

The initial efforts of e-governance simply resulted in only partial automation of the existing paper based manual procedures and did not result in any significant reengineering or optimization. While implementation of ICT in the business has resulted in good amount of Business Process Reengineering (BPR) as to move away from redundant and inefficient functional business units and to restructure organizations around processes that support core business, in the government enterprises such radical or significant changes have failed to happen to a large extent. This situation could be traced to various factors in government functioning such as conservatism, resistance to change, and rigidity of legislation which impedes the amendment of rules and procedures.

As a result, ICT based management methodologies such as Business Process Reengineering, Supply Chain Management, Just In Time (JIT) methodologies, which had salutary effects in business and industry had left the government system practically untouched. The scope and extent of c-governance have been largely limited to simple applications with the maximum of computerized MIS and database management within the government departments along with gradually enhanced usage of simple ICT technologies such as e-mail, and limited usage of Internet and video conferencing for government functions.

However, the significant issues that have become highly relevant for large scale implementation of ICT in governance are the issues of security, privacy. Vulnerability of public ICT infrastructure to crime, potential for abuse, terrorism, and general crime, in addition to issues related to social cohesion, and social exclusion following what is popularly known as the digital divide.

Notwithstanding the issue of digital divide which basically refers to lack of access of poor people and rural people to Internet, the indirect benefits to all citizens from computerization and ICT in the government machinery will go a long way in improving the quality of life of people. Thus, the scope of ICT implementation in government machinery can result in:

- Improvement of efficiency and effectiveness of the executive functions of government, including delivery of public services;
- Greater transparency of government to citizens and business. permitting greater access to the information generated or collated by the government;
- Fundamental changes and improvement in relations between citizen and the state thereby improving the democratic process; and
- Better interactions and relationships amongst different
    - wings of the same government,
    - state or local governments within a country,
    - countries whose governments are web-enabled.

Any e-governance activity/project involves appropriate:

- Hardware and corresponding system software.
- Networking of the hardware identified above- both the Internet and Intranet environment, and
- Application software along with appropriate database management software.

5. Benefits and Reasons for the Introduction of e- Governance:

The ultimate goal of the E-Government is to be able to offer an increased portfolio of public services to citizens in an efficient and cost effective manner. E-government allows for government transparency. Government transparency is important because it allows the public to be informed about what the government is working on as well as the policies they are trying to implement. Simple tasks may be easier to perform through electronic government access. Many changes, such as marital status or address changes can be a long process and take a lot of paper work for citizens. E-government allows these tasks to be performed efficiently with more convenience to individuals. E-government is an easy way for the public to be more involved in political campaigns. It could increase voter awareness, which could lead to an increase in citizen participation in elections. It is convenient and cost-effective for businesses, and the public benefits by getting easy access to the most current information available without having to spend time, energy and money to get it.

Benefits

- **Democratization.** One goal of e-government will be greater citizen participation. Through the internet, people from all over the country can interact with politicians or public servants and make their voices heard. Blogging and interactive surveys will allow politicians or public servants to see the views of the people they represent on any given issue. Chat rooms can place citizens in real-time contact with elected officials, their offices or provide them with the means to replace them by interacting directly with public servants, allowing voters to have a direct impact and influence in their government. These technologies can create a more transparent government, allowing voters to immediately see how and why their representation in the capital is voting the way they are. This helps voters better decide who to vote for in the future or how to help the public servants become more productive. A government could theoretically move more towards a true democracy with the proper application of e-government. Government transparency will give insight to the public on how decisions are made and hold elected officials or public servants accountable for their actions. The public could become a direct and prominent influence in government legislature to some degree.

- **Environmental Bonuses.** Proponents of e-government argue that online government services would lessen the need for hard copy forms. Due to recent

pressures from environmentalist groups, the media, and the public, some governments and organizations have turned to the Internet to reduce this paper use. The United States government utilizes the website http://www.forms.gov to provide "internal government forms for federal employees" and thus "produce significant savings in paper.

- **Speed, efficiency, and convenience.** E-government allows citizens to interact with computers to achieve objectives at any time and any location, and eliminates the necessity for physical travel to government agents sitting behind desks and windows. Improved accounting and record keeping can be noted through computerization, and information and forms can be easily accessed, equaling quicker processing time. On the administrative side, access to help find or retrieve files and linked information can now be stored in databases versus hardcopies stored in various locations. Individuals with disabilities or conditions no longer have to be mobile to be active in government and can be in the comfort of their own homes.

- **Public approval.** Recent trials of e-government have been met with acceptance and eagerness from the public. Citizens participate in online discussions of political issues with increasing frequency, and young people, who traditionally display minimal interest in government affairs, are drawn to e-voting procedures.

Disadvantages:

The main disadvantages concerning e-government is the lack of equality in public access to the internet, reliability of information on the web, and hidden agendas of government groups that could influence and bias public opinions.

- **Hyper-surveillance.** Increased contact between government and its citizens goes both ways. Once e-government begins to develop and become more sophisticated, citizens will be forced to interact electronically with the government on a larger scale. This could potentially lead to a lack of privacy for civilians as their government obtains more and more information on them. In a worst case scenario, with so much information being passed electronically between government and civilians, a totalitarian-like system could develop. When the government has easy access to countless information on its citizens, personal privacy is lost.

- **Cost.** Although "a prodigious amount of money has been spent" on the development and implementation of e-government, some say it has yielded only a mediocre product. The outcomes and effects of trial Internet-based governments are often difficult to gauge or unsatisfactory.

- **Inaccessibility.** An e-government site that provides web access and support often does not offer the "potential to reach many users including those who live in remote areas, are homebound, have low literacy levels, exist on poverty line incomes."

- **False sense of transparency and accountability.** Opponents of e-government argue that online governmental transparency is dubious because it is maintained by the governments themselves. Information can be added or removed from the public eye. To this day, very few organizations monitor and provide accountability for these modifications. Even the governments themselves do not always keep track of the information they insert and delete.

6. e- Governance Models:

Models for e-governance, especially in the developing countries, are essential for a right perspective on e-governance implementation. Now we shall survey some models for e-governance in developing countries.

Broadcasting/Wider Dissemination Model:

Principle

The model is based on dissemination of information relevant to better governance that is already in the public domain into wider public domain through the use of ICT and convergent media. The wider dissemination models opens up an alternative channel for people to access information as well as validate information available in the local domain from external sources. The widespread application of this model gradually corrects the situation of information failure and provides people with the basic government-related information to come to a common understanding and decide upon the future course of action.

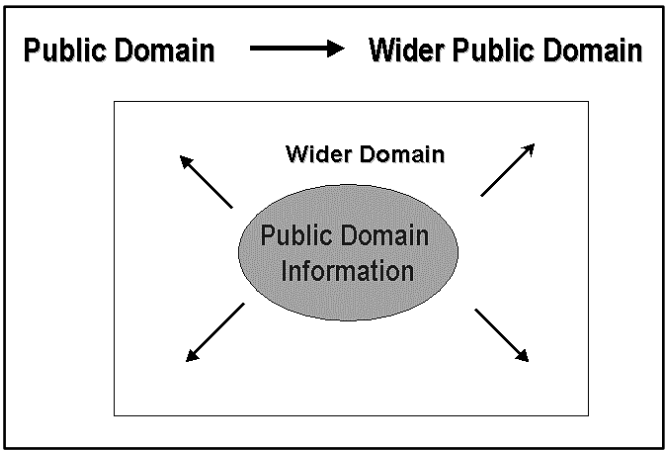

Fig 1. Broadcasting/Wider Dissemination Model.

Applications

- Putting government laws and legislation online.
- Making available the names, contact addresses, e-mails, and fax
- Numbers of local governmental officials online.
- Making available key information pertaining to governmental plans, budgets, expenditures, and performances online.
- Putting key court judgements/judicial statements that are of value to common citizens and creating precedence for future actions online, viz. key environment related judgements, State vs. Citizen Court rulings, etc.

Example: Project GISTNIC (General Information Services Terminal of National Informatics Centre) is an example of this model. In this project, the government agency (NIC) disseminates general information of about 25 subjects such as Economy, Education, Census, Tourism, etc. to general public. Government Orders (GOs) also are being publicised. However, after the advent and popularity of Internet, almost all government departments have been setting up or maintaining websites providing information about themselves to the public in general. The web sites of government departments can be reached through www.nic.in, a general government web site.

Critical Flow Model:

Principle

The model is based on channelling information of critical value to a targeted audience or spreading it in the wider public domain through the use of ICT and convergent media. The model requires foresight to understand the significance of particular information set and use it strategically. It may also involve locating users to

whom the availability of a particular information set would make a critical difference in initiating good governance.

The strength of Critical Flow Model is the inherent characteristic of ICF that makes the notion of distance and time redundant. This reduces the cases of exploitative governance possible earlier due to time lag between availability of information to different users.

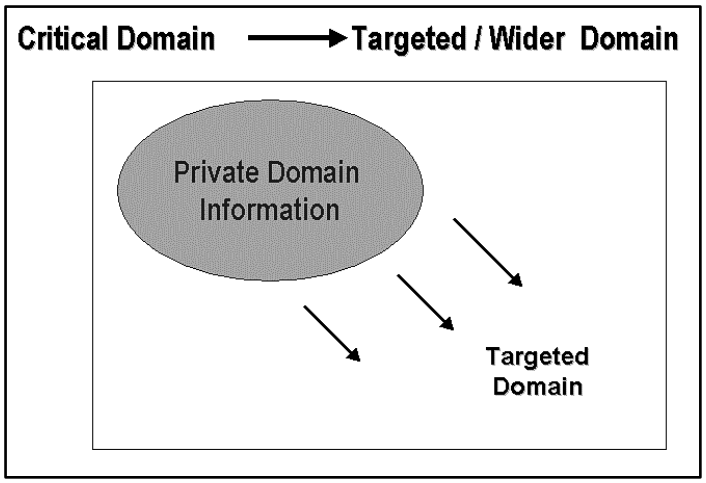

Fig 2. Critical Flow Model.

Applications

The applications involve making available:

- information on corruption (by an appropriate legal authority) of a particular government ministry or government officials, to its electoral constituency or to the concerned governing body (e.g., the web sites of Central Vigilance Commission);
- research studies, enquiry reports and appraisals commissioned by the government to the affected parties;
- human rights violation and criminal impeachment records against government officials to NGOs and concerned citizens; and
- Environment related information to local communities, for example, information on radioactivity spills, effluent discharge in rivers, green ratings of a company, etc.

Comparative Analysis Model:

Principle

The Comparative Analysis Model is based on exploring information available in the public or private domain and comparing it with the actual known information sets to derive strategic leanings and arguments. The model continuously assimilate new knowledge products and uses them as a benchmark to evaluate, influence or advocate changes in current governance policies and actions. The comparison could be made over a time scale to get a snapshot of the past and present situation (before-after analysis) or between two different situations to understand the effectiveness of an intervention (with or without analysis). The strength of this model lies in the boundless capacity of ICT to store information in a retrievable manner and transmit it almost instantaneously across all geographical and hierarchical barriers.

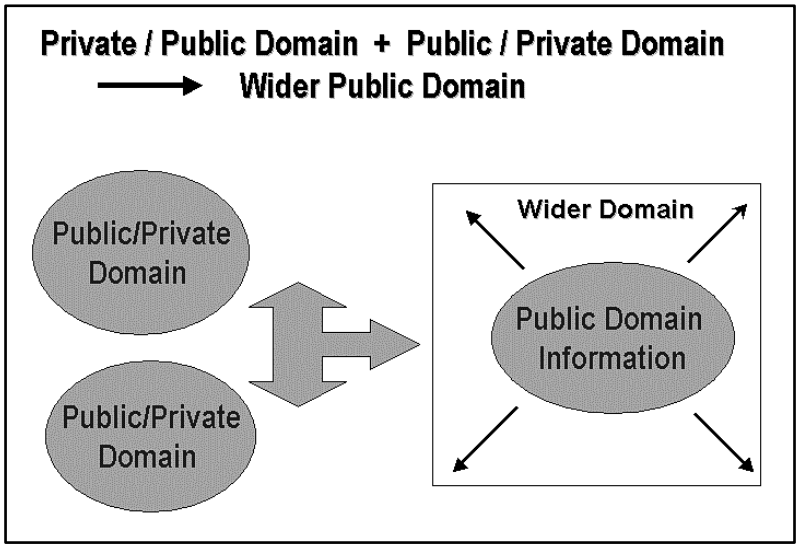

Fig 3. Comparative Analysis Model.

Applications

- To learn from past policies and actions and derive learning lessons for future policy-making.
- To evaluate the effectiveness of the current policies and identify key learnings in terms of strengths and flaws in the policies.
- To effectively establish conditions of Precedence, especially in the case of Judicial or legal decision-making (example for resolving patent-related disputes, public goods ownership rights), and use it to influence/ advocate future decision-making.
- To enable informed decision-making at all levels by enhancing the background knowledge and also providing a rationale for action.

- To evaluate the performance and track-record of a particular decision-maker/ decision-making body.

Mobilization and Lobbying Model:

Principle

Mobilization and Lobbying Model is one of the most frequently used digital governance models and has often come to the aid of civil society organizations in developing countries to impact international decision-making processes. The model is based on planned, directed, strategic flow of information to build strong virtual allies to strengthen action in the real world. It takes up the proactive approach of forming virtual communities which share similar values and concerns, promoting active sharing of information between these communities, and linking them with real-world activities.

The strength of this model is in the diversity of its virtual community, and the ideas, expertise and resources accumulated through virtual forms of networking. The model is able to effectively overcome geographical, institutional and bureaucratic barriers to shape concerted action. It also provides a strong virtual arm to several activities such as directing campaigns against a particular individual or decision-making body.

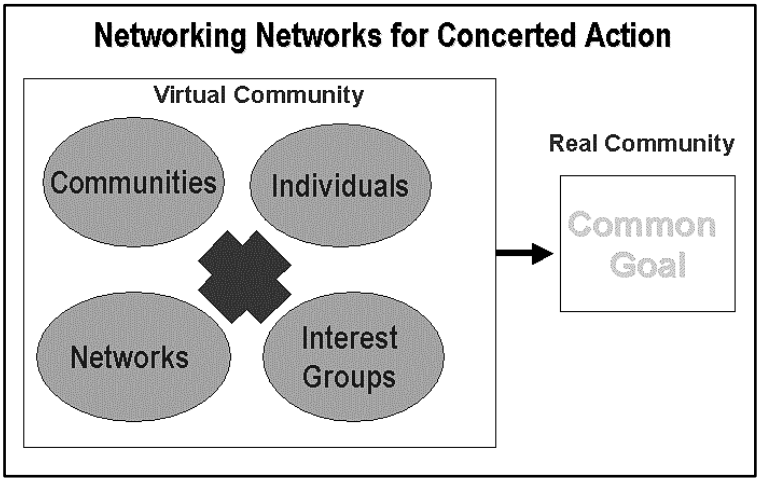

Fig 4. Mobilization and Lobbying Model.

Applications

This model could be applied in the following possible ways:

- Fostering public debates on issue of larger concerns, namely on the themes of upcoming conferences, treaties etc.

- Formation of pressure groups on key issues to force decision-makers to take their concerns into cognizance.
- Making available opinions of suppressed groups who are not involved in the decision-making process into wider public domain.
- Catalyzing wider participation in decision-making processes.
- Building up global expertise on a particular theme in absence of localized information to aid decision-making.

Interactive-Service Model/Government-to-Citizen to-Government Model (G2C2G):

Principle

Interactive-Service Model in many ways is a consolidation of the earlier digital governance models and opens up avenues for direct participation of individuals in the governance processes. This model fully captures the potential of ICT and leverages it for greater participation, efficiency and transparency in the functioning of government as well as savings in time and costs relating to decision-making.

The Interactive-Service Model makes possible various services offered by the government to be directly accessible to citizens. It creates an interactive Government-to-Consumer-to-Government (G2C2G) channel in various functions such as election of government officials (e-ballots), filing of tax returns, procurement of government services, sharing of concerns and providing expertise, conducting opinion polls on public issues, and grievance redressing.

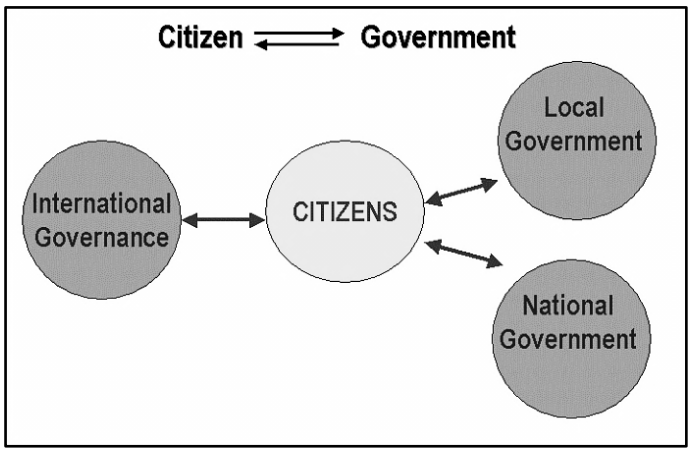

Fig 5. Interactive-Service Model/ Government-to-Citizen to-Government Model.

Applications

This model could be applied in the following possible ways:

- To establish an interactive communication channels with key policy-makers and members of Planning Commissions.
- To conduct electronic ballots for the election of government officials and other office bearers.
- To conduct public debates / opinion polls on issues of wider concern before formulation of policies and legislative frameworks.
- Filing of grievances, feedback and reports by citizens with the concerned governmental body.
- Establishing decentralized forms of governance.
- Performing governance functions online such as revenue collection, filing of taxes, governmental procurement, payment transfer etc.

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UNIT- 4TH

E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of nationwide networking in e-governance, e-seva.

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1. e- Readiness & e- Government Readiness:

The CSPP's guide to E-Readiness defines an 'e-ready' community as one that has high-speed access in a competitive market; with constant access and application of ICTs in schools, government offices, businesses, healthcare facilities and homes; user privacy and online security; and government policies which are "favorable to promoting connectedness and use of the Network." The Asian Pacific Economic Cooperation (APEC) group defines a country as e-ready that is 'ready' for e-commerce, has free trade, industry self-regulation, ease of exports, and compliance with international standards and trade agreements. McConnell International defines e-Readiness as the capacity of nations to participate in the digital economy. World Economic Forum Consultation Report on E-Readiness defines E-Readiness as the ability of the ICT networks to effectively adapt to the social and economic advancement.

General Approach to e- Readiness

E-Readiness is the ability to use information and communication technologies (ICT) to develop one's economy and to foster one's welfare. E-Readiness indices at the macro level are constructed primarily for ranking countries, facilitating comparisons between countries and over time. They can also be used to track the global digital divide, i.e. the gap between countries that have access to ICT and those that do not (mainly because of differences in income, education, etc.).

E-Readiness is generally defined as the degree to which a society is prepared to participate in the digital economy with the underlying concept that the digital economy can help to build a better society. Regardless of a country's level of development, readiness is assessed by determining the relative standing of its society and its economy in the areas that are most critical for its participation to the

networked world. However, e-Readiness can be a relative concept and it could be defined differently depending on each country's priorities and perspective.

Beyond "e-Readiness", you may look for "e-efficiency", which is the use of ICTs to reach more quickly the development goals specific to a country. A review of recent experiences in the developing world shows that the countries which are the most successful in creating a favorable climate for the use of ICTs are those that make it a priority. Their determination to participate in the digital world is reflected by rapidly focused actions supported by superior planning and sustained by dynamic public-private partnerships. To progress toward their goal, these countries rely on a strategic framework that assists in setting up their priorities and maintaining impetus.

Although there is often pressing urgency to act rapidly, comprehensive action cannot be rushed, particularly when there are large amounts of funding involved –and this is the case when attention is given to infrastructure. The complete e-Readiness process comprises three main phases, usually undertaken sequentially:

- **Phase I** is the **assessment**,
- **Phase II** is the **development of a strategy** and the **preparation of an action plan**, and
- **Phase III** is the **implementation** of the action plan.

When the purpose is to work at the level of a country, there is little advantage in acting upon the three phases simultaneously – e.g., starting a project in one area while conducting an assessment in another. The e-Readiness process should therefore be seen as a linear one, each phase building on the results of the previous one. It is however not a finite process: evaluation accompanies implementation and with new data emerging, strategies, action plans and projects can be improved or even modified to adjust to new conditions. Evaluation should be seen as an extension of assessment - a dynamic and evolving assessment.

Fig 1. E-Readiness Process.

The **strategic framework** varies from country to country. It is however possible to define a general approach to e-Readiness: there are five main areas of activities that contribute to the overall e-Readiness of a country. These main areas, in relation to each other, can be represented as a sort of four-tiered concentric circle revolving around a core:

1. **Access and connectivity** are essential to the very existence of networks, and if they are deficient there is little point in moving on to the next focus area.
2. **Training, Education and public awareness** are one of the main barriers to network development in many developing countries ; the internet is, after all, based on the written word, and mainly in English (although this situation is changing rapidly).
3. **Government Leadership** is often the main vector of network development in most developing countries. Its laws and regulations are often the corner stone of a fast and successful implementation. New emerging markets are therefore created, opening new economic sectors with new windows of opportunities.
4. **Business and Private Sector Initiatives** are key to the fulfillment and proper deployment of networks, and will provide constant backing for the pursuit of readiness objectives. Initiatives from this sphere will be driving the readiness of the country.
5. **Social Development** builds up on the result of initiatives taken in other areas but should also be promoted through specific interventions if the Internet is expected to contribute significantly to the alleviation of poverty.

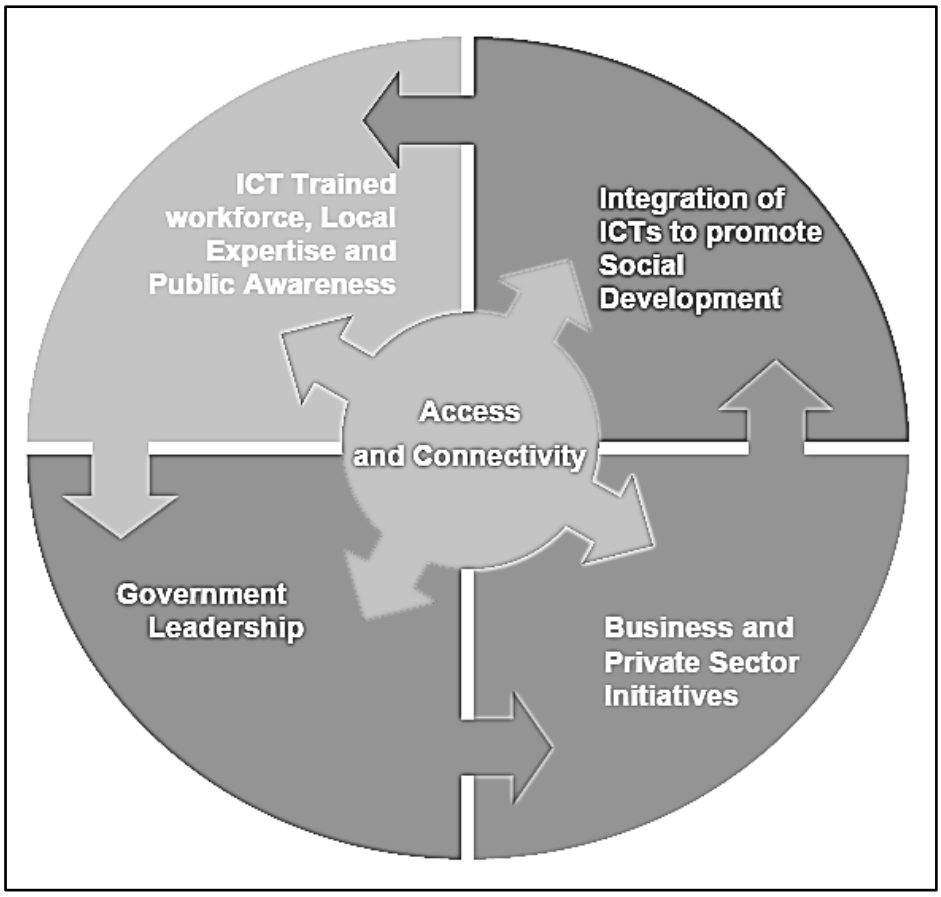

Fig 2. E-Readiness Strategic Framework.

e- Readiness Objectives

- **E-Infrastructure.** If the objective is on E-Infrastructure then the focus should be on institutions, hardware and software *Here e-readiness equals computers and access* –computer hardware and network access are required to be e-ready and bridge the digital divide, and government and private initiatives should supply them.
- **E-Economy.** If the objective is on e-commerce then the focus should be on ICT Business. *Here e-readiness equals computers, access, and economy* – computer hardware and network access are required for e-readiness, but the market will solve this problem on its own.
- **E-Society.** If the objective is on the society then the focus should be complete population. *Here e-readiness requires basic literacy, poverty, health and other social issues to be addressed first* – computers are useful, but nothing will make a society e-ready and bridge the digital divide until basic literacy, poverty, and healthcare issues are addressed.
- **E-Governance.** If the objective is E-Governance then the focus should be on Government Process Reengineering and faster and transparent means of delivering government services to the citizens. *Here e-readiness equals computers,*

access, and effective usage of computers – hardware and access are not enough for real e-readiness, there must be extensive training programs, locally relevant content, and a local ICT sector; and a Business Process Reengineering along with.

2. e- Framework, Step & Issues:

The e-Framework for Education and Research is an international initiative that provides information to institutions on investing in and using information technology infrastructure. It advocates service-oriented approaches to facilitate technical interoperability of core infrastructure as well as effective use of available funding. The e-Framework supports a service oriented approach to developing and delivering education, research and management information systems. Such an approach maximises the flexibility and cost effectiveness with which systems can be deployed, both in an institutional context, nationally and internationally.

The e-Framework allows the community to document its requirements and processes in a coherent way, and to use these to derive a set of interoperable network services that conform to appropriate open standards. By documenting requirements, processes, services, protocol bindings and standards in the form of 'reference models' members of the community are better able to collaborate on the development of service components that meet their needs (both within the community and with commercial and other international partners). The 'e-Framework' also functions as a strategic planning tool for the e-Framework partners.

The e-Framework consists of structural, process, informational and community participation components. The structural parts draw together a wide range of information and will be made available through the e-Framework's website. The process component, as well as the policies and procedures for the e-Framework Partnership operations and activities, covers processes for the creation of content of the e-Framework and processes for its deployment and effective use. The structural part of the e-Framework has, in turn, two main parts:

- A set of Reference Models.
- A set of Services.

Reference Models: A Reference Model identifies a common learning, teaching, research or business requirement and shows how one or more Services can be used

to meet this need. A Reference Model also provides cross-links to the Services that it uses in the Service part of the e-Framework. The development of Reference Models is seen as a community based process, involving domain experts and practitioners in analyzing existing good practices and problem areas, and in designing the information and process models on which they are based.

Services: A Service exposes information or functionality through a public interface that other systems can call on and utilize. Service descriptions will include high level abstract service definitions together with references to available specifications and standards for that service. Clients implementing a service consumer specification may call on any service that implements the corresponding service provider specification. Clients and Services are thus only 'loosely' connected, increasing flexibility.

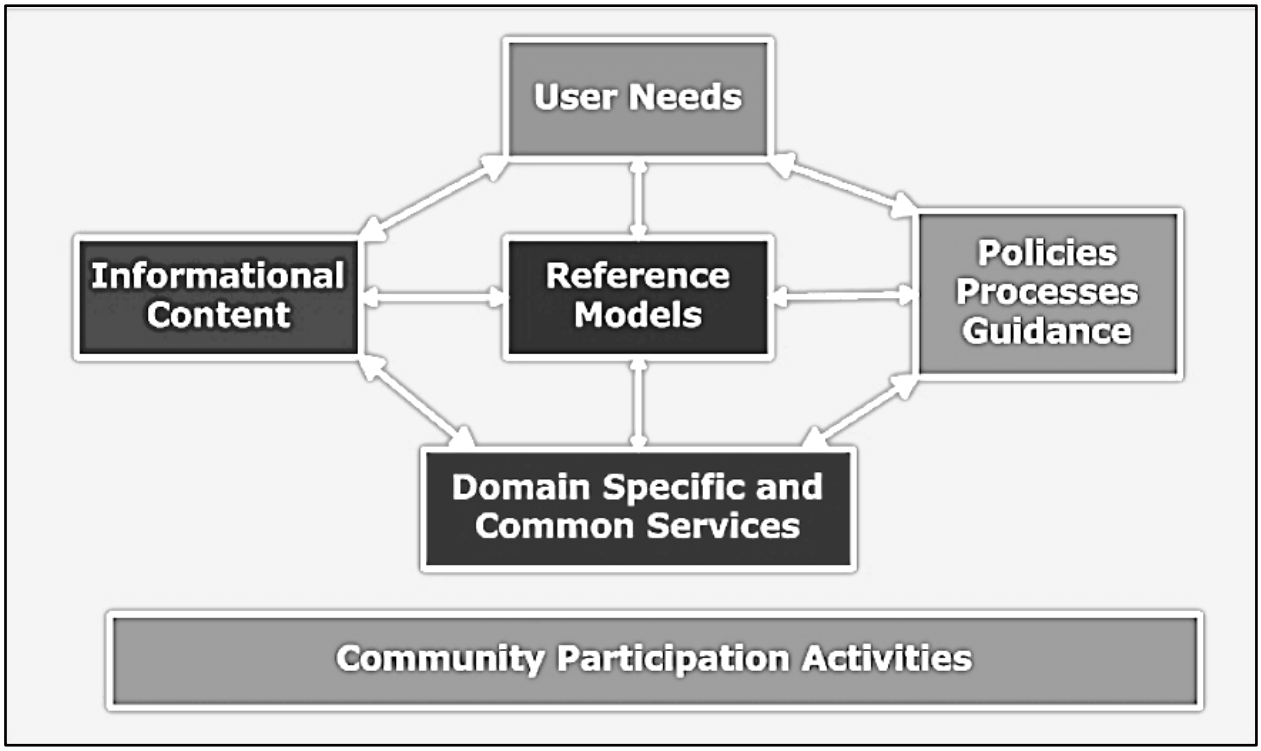

Fig 3. E- Framework.

The e-Framework thus seeks to provide:

- A classification of the domains that are important to the e- Framework Partners against which can be mapped both the reference models and the service specifications/standards. These in turn will contain references to the relevant software tools, applications and service implementations, as well as to associated Partners' Development activities.
- A set of processes for developing and populating its structure and content.

- Guidance on its effective use.

E-Framework has been developed to “to facilitate technical interoperability within and across educational and research through improved strategic planning and implementation processes”.

3. Application of Data Warehousing and Data Mining in e-Government:

Introduction

Data warehousing and data mining are the important means of preparing the government to face the challenges of the new millennium. Data warehousing and data mining technologies have extensive potential applications in the government—in various Central Government sectors such as Agriculture, Rural Development, Health and Energy and also in State Government activities. These technologies can and should therefore be implemented.

Data Mining

Data mining, *the extraction of hidden predictive information from large databases*, is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. The automated, prospective analyses offered by data mining move beyond the analyses of past events provided by retrospective tools typical of decision support systems.

Need for Data Warehouse

Governments deal with enormous amount of data. In order that such data is put to an effective use in facilitating decision-making, a data warehouse is constructed over the historical data. It permits several types of queries requiring complex analysis on data to be addressed by decision-makers.

When used properly, it can help planners and decision makers in making informed decisions leading to positive impact on targeted group of citizens. However to use information to its fullest potential, the planners and decision makers need instant

access to relevant data in a properly summarized form. In spite of taking lots of initiative for computerization, the Government decision makers are currently having difficulty in obtaining meaningful information in a timely manner because they have to request and depend on IT staff for making special reports which often takes long time to generate. An Information Warehouse can deliver strategic intelligence to the decision makers and provide an insight into the overall situation. This greatly facilitates decision-makers in taking micro level decisions in a timely manner without the need to depend on their IT staff. By organizing person and land-related data into a meaningful Information Warehouse, the Government decision makers can be empowered with a flexible tool that enables them to make informed policy decisions for citizen facilitation and accessing their impact over the intended section of the population.

National Data Warehouses

A large number of national data warehouses can be identified from the existing data resources within the Central Government Ministries. Let us examine these potential subject areas on which data warehouses may be developed at present and also in future.

Applications

- **Census Data.** The Registrar General and Census Commissioner of India decennially compile information of all individuals, villages, population groups, etc. This information is wide ranging such as the individual-slip, a compilation of information of individual households, of which a database of 5% sample is maintained for analysis. A data warehouse can be built from this database upon which OLAP (On-Line Analytical Processing) ttechniques can be applied. Data mining also can be performed for analysis and knowledge discovery.

  A village-level database was originally developed by National Informatics Centre at Hyderabad under General Information Services Terminal of National Informatics Centre (GISTNIC) for the 1991 Census. This consists of two parts: primary census abstract and village amenities. Subsequently, a data warehouse was also developed for village amenities for Tamil Nadu. This enables multidimensional analysis of the village level data in such sectors as Education, Health and Infrastructure. The fact data pertains to the individual village data compiled under 1991 Census.

As the census compilation is performed once in ten years, the data is quasi-static and, therefore, no refreshing of the warehouse needs to be done on a periodic basis. Only the new data needs to be either appended to the data warehouse or alternatively a new data warehouse can be built. There exist many other subject areas (e.g. migration tables) within the census purview which may be amenable and appropriate for data warehouse development, OLAP and data mining applications on which work can be taken up in future.

- **Prices of Essential Commodities.** The Ministry of Food and Civil Supplies, Government of India, compiles daily data (on weekly basis) for about 300 observation centres in the entire country on the prices of essential commodities such as rice, edible oils, etc. This data is compiled at the district level by the respective State Government agencies and transmitted online to Delhi for aggregation and storage. A data warehouse can be built for this data, and OLAP techniques can be applied for its analysis. A data mining and forecasting technique can be applied for advance forecasting of the actual prices of these essential commodities. The forecasting model can be strengthened for more accurate forecasting by taking into account the external factors such as rainfall, growth rate of population and inflation. A limited exercise in this direction was already executed at a State level (in Tamil Nadu).

- **Agriculture.** The Agricultural Census performed by the Ministry of Agriculture, Government of India, compiles a large number of agricultural parameters at the national level. District-wise agricultural production, area and yield of crops is compiled; this can be built into a data warehouse for analysis, mining and forecasting. Statistics on consumption of fertilizers also can be turned into a data mart. Data on agricultural inputs such as seeds and fertilizers can also be effectively analysed in a data warehouse. Data from livestock census can be turned into a data warehouse. Land-use pattern statistics can also be analysed in a warehousing environment. Other data such as watershed details and also agricultural credit data can be effectively used for analysis by applying the technologies of OLAP and data mining.

- **Rural Development.** Data on individuals below poverty line (BPL survey) can be built into a data warehouse. Monitoring and analysis of progress made on implementation of rural development programmes can also be made using OLAP and data mining techniques.

- **Health.** Community needs assessment data, immunization data, data from national programmes on controlling blindness, leprosy, and malaria can all be used for data warehousing implementation, OLAP and data mining applications.

- **Planning.** At the Planning Commission, data warehouses can be built for state plan data on all sectors: labour, energy, education, trade and industry, five year plan, etc.

- **Education.** The Sixth All India Educational Survey data has been converted into a data warehouse (with about 3 GB of data). Various types of analytical queries and reports can be answered. 4.3.6 Commerce and Trade Data bank on trade (imports and exports) can be analysed and converted into a data warehouse. World price monitoring system can be made to perform better by using data warehousing and data mining technologies. Provisional estimates of import and export also are made more accurate using forecasting techniques.

- **Commerce and Trade.** Data bank on trade (imports and exports) can be analysed and converted into a data warehouse. World price monitoring system can be made to perform better by using data warehousing and data mining technologies. Provisional estimates of import and export also are made more accurate using forecasting techniques.

- **Other Sectors.** In addition to the above mentioned important applications, there exist a number of other potential application areas for data warehousing and data mining, as follows:
    - **Tourism.** Tourist arrival behaviour and preferences; tourism products data: foreign exchange earnings data; and Hotels, Travel and Transportation data.
    - **Programme Implementation**. Central projects data (for monitoring).
    - **Revenue.** Customs data, central excise data, and commercial taxes data (state government).
    - **Economic affairs.** Budget and expenditure data; and annual economic survey.
    - **Audit and accounts.** Government accounts data.

All government departments or organizations are deeply involved in generating and processing a large amount of data. Conventionally, the government departments have largely been satisfied with developing single management information systems (MIS), or in limited cases, a few databases which were used online for limited reporting purposes. Much of the analysis work was done manually by the Department of Statistics in the Central Government or in any State Government. The techniques used for analysis were conventional statistical techniques on largely batch-mode processing. Prior to the advent of data warehousing and data mining technologies nobody was aware of any better techniques for this activity. In fact, data warehousing and data mining technologies could lead to the most significant advancements in the government functioning, if properly applied and used in the government activities. With their advent and prominence, there is a paradigm shift which may finally result in improved governance and better planning by better utilization of data. Instead of the officials wasting their time in processing data, they can rely on data warehousing and data mining technologies for their day- to-thy decision making and concentrate more on the practical implementation of the decisions so taken for better performance of developmental activities.

Further, even though various departments in the government (State or Central) are functionally interlinked, the data is presently generated, maintained and used independently in each department. This leads to poor (independent) decision making and isolated planning. Here in lies the importance of data warehousing technology. Different data marts for separate departments, if built, can be integrated into one data warehouse for the government. Data warehouses can be built at Central level, State level and also at District level.

Conclusion

In the government, the individual data marts are required to be maintained by the individual departments (or public sector organizations) and a central data warehouse is required to be maintained by the ministry concerned for the concerned sector. A generic inter-sectorial data warehouse is required to be maintained by a central body (as Planning Commission). Similarly, at the State level, a generic inter-departmental data warehouse can be built and maintained by a nodal agency, and detailed data warehouses can also be built and maintained at the district level by an appropriate agency. National Informatics Centre may possibly play the role of the nodal agency at Central, State and District levels for developing and maintaining data warehouses in various sectors.

4. Case Studies: NICNET- Role of Nationwide Networking in e-Governance:

Introduction

National Informatics Centre (NIC), as a constituent unit under the then Department of Electronics, Government of India, providing Informatics services to government Departments and bodies since 1977, is undeniably the pioneer institution for e-governance in India. It has played a catalytic role in creating informatics awareness in government. NICNET (National Informatics Centres Network) the nationwide satellite based network of NIC was established in 1985—86 for easy access of information for State and Central Governments across the nation, ensuring reliable, timely and accurate information for optimal use of resources.

When Government of India approved NICNET, the National Informatics Centre had to evaluate various technology options of the day and come to an optimal solution for a nationwide data network. The prospect of linking geographically disparate 600 odd districts and state capitals through terrestrial DOT lines was not viable in view of the then poor data handling capabilities of voice lines of the Department of Telecom, and the cost and complexity involved in it. In view of our national success stories in satellite communication, be it in broadcasting, television or voice, a satellite based solution for the purpose of linking all the state capitals and district headquarters through a data network appeared most appropriate. It gave a solution which was distance independent, cheap, scalable and easily deployable. Once the satellite option was made, the issue of mechanism of channel sharing was addressed. Since the already crowded C-band was the only available microwave band in the mid-eighties bandwidth was a scarce resource and the satcom network envisaged had to use it optimally. To provide two way communications to a large number of nodes using classical Time Division Multiple Access (TDMA)/Frequency Time Division Multiple Access (FTDMA) mechanisms of carrier sharing were not feasible unless costlier and complex sharing mechanisms were incorporated.

Hence it was decided to go for a Code Division Multiple Access (CDMA) based on Very Small Aperture Terminal (VSAT) networking under the NICNET programme. Commercially viable, cheap VSATs in C-band using CDMA Spread Spectrum technologies were available which enabled using thousands of nodes for the same carrier in the two-way data link. The advantages of the CDMA- VSAT option chosen were specifically:

- Small size (1.2 m dia.)
- Low cost
- Ease of installation and deployment
- Easy scalability

The VSAT had a 1200 bps uplink and 19.2 kbps downlink, though a few VSATs had an uplink of 9600 bps. This low speed was, of course, a limitation. However it was felt that, for the character-mode government transactions of mid- eighties, this C-band VSAT network provided an optimal technology.

Within one year of its conception, i.e. in May 1985, the VSATs sprang up throughout the country dotting all State capitals and District Headquarters of Government. How did it help in e-governance? Let us probe into these using VSATs as communication links some of the pioneering applications of NICNET in governance were the following:

A. **Electronic Mail for Government Communications**. NICNET provided pre-internet, electronic mail to all secretariats of state governments, ministries of Government of India, and district collectorate through a centralized e-mail service.
B. **Database Access.** NICNET helped its users to access databases like GI STNIC (General Information Services Terminal—National Informatics Centre), MEDLARS (Medical Literature Analysis and Retrieval Systems), etc. from remote locations.
C. **Telnet**. NICNET enabled remote login of systems across the country.
D. **File transfer protocol (FTP).** NICNET enabled file transfer across States and Districts. This application was widely used for, applications like budget transmission, and election result analysis.

These applications provided support to nascent e-governance efforts of Central ministries and State governments at the secretariat level, district collectorates and the judiciary.

Regional passport offices, registrar of companies, high courts and Supreme Court, central excise, Doordarshan were some of the prominent users of the NICNET. Budget transmission, election result analysis, cause list Access of courts, company name registration, were some of the more important applications based on NICNET. Accessing Medical Literature Analysis and Retrieval System (MEDLARS) database and

General Information Services Terminal of National Informatics Centre (GISTNIC) database from remote corners of the country demonstrated the potential of data network in public administration.

With the advent of multimedia information on PCs and the slow but sure penetration of the Internet in the early nineties, it was felt that the speed of transmission provided by the C-band NICNET was inadequate. Conscious of the catalytic role played by the NICNET in e-governance, NIC decided to provide a high speed overlay network over the C-band to provide higher data rates.

With great persistence and persuasion, NIC succeeded in getting necessary approval for operating ku-band based VSATs. Accordingly, high speed Single Channel Per Carrier (SCPC) ku-band VSATs were installed in all major state capitals in the first phase. These provided speeds of 128 k—256 kbps. This overlay network was integrated with C-band and Internet. With the commissioning of this overlay on NICNET, all the services on the Internet like web access, e-mail, etc. became available at all NICNET nodes.

Subsequently, high speed ku-band VSATs were installed in several districts with all the services on internet accessible. Mail servers and configured and internet access made easy at district and sub-district level. This has made web-enabled application possible at even sub-district levels for E-governance application.

Conclusion

In this case study we have seen how a national Wide Area Network (WAN) for India, NICNET, was set up as early as 1986, the first government informatics network in the world. We have also seen how this network was pioneering government applications of e-mail, telnet, ftp and Internet. NICNET was upgraded to meet the present day requirements of the government at various levels.

With the demand for bandwidth growing exponentially and optical fibre circuits providing economical abundant bandwidth resources across the country, MC has started integrating its network with Fibre Optics Circuit (FOC) in major state centres like Hyderabad, Chennai, Mumbai, Trivandrum, Bangalore, etc., and by 2004 end NICNET will have a minimum 2 Mbps FOC link connecting its state units with its main hub at New Delhi.

5. e- Seva:

Introduction

It is an attempt to replace the traditional form of governance and its accompanying deficiencies with a modern, more open, transparent and responsive service delivery system, it provides online real time services to the citizens. One can say “looking at services from the citizens' point of view”. State Governments in India, has established Web-enabled rural 'e-Seva Centres'.

Example. e- Seva project; run by the West-Godavari District Administration in Andhra Pradesh State. The project delivers government services, facilitates utility and tax payments and provides business services

The Vision

The Government of Andhra Pradesh has a clear vision to create a knowledge society by using Information Technology in all aspects of development and governance. Pioneering efforts are being made to reach the benefits of IT to the citizens - urban and rural, rich and poor, literate and illiterate. The Government is conscious of the dangers of the 'digital divide', and is making special provisions for reaching the 'information have-nots'.

Why e- Seva?

Situation prior to e- Seva:

- Citizen to visit multiple offices even for simple services like payments.
- Restricted service hours: 10.30 AM to 5.00 PM.
- Service hours not convenient for many citizens.
- Long journeys and travel time to offices.
- Long Queues.
- Too much physical interface with offices staff.

e- Seva Objectives

- Citizen services closure to people.
- Multiple services under one roof.
- System driven delivery of services.
- Transparency in delivery of services.
- Least physical interface with office staff.
- Convenient and extended service hours.

- Citizen friendly and comfortable ambience.
- Value for Time and Money.

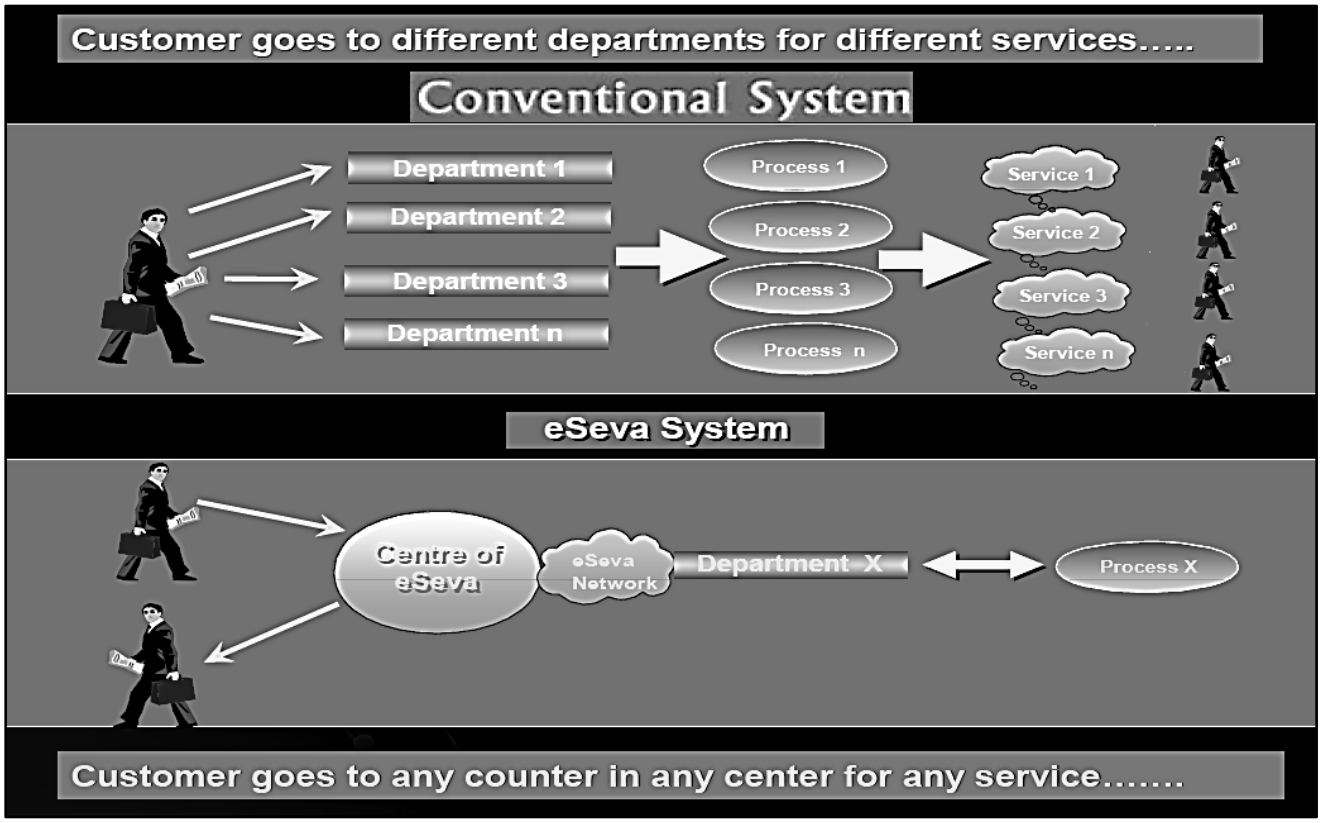

Fig 4. E- Seva Concept.

An Integrated Approach

- Integration of departments - central and state governments.
- Integration of services.
- Integration of G2C and B2C.
- Efficiency, Reliability, Transparency and Scalability are the watchwords at eSeva.

Salient Features of e- Seva

- All service counters are facilitated with an electronic queuing system.
- Operating from 8.00 am to 8.00 pm, on all working days and 9.00am to 3.00pm on holidays (Second Saturdays & Sundays).
- 'One-stop-shop' for over 66 G2C and B2C services.
- No jurisdiction limits - any citizen can avail of the services at any of the service centres.
- Online services: eForms, eFiling, ePayments.
- Payments by cash/cheque/DD/credit card/Internet.

Applications/ Citizen- Friendly Services of e- Seva

e-Seva offers a wide spectrum of citizen-friendly services that will save citizens the bother of running around various departments.

- **Payment of Utilities Bills**
  - Electricity bills
  - Water and sewerage bills
  - Telephone bills (BSNL & TATA Tele Services)
  - Property Tax
  - Sales Tax

- **Certificates**
  - Registration of births / deaths
  - Issue of birth / death certificates
  - Issue of Caste/Nativity Certificates

- **Permits / Licenses**
  - Medical and Health Department: Renewal of Drug Licenses
  - Issue / renewal of trade licenses

- **Transport Department Services**
  - Change of address of a vehicle owner
  - Transfer of ownership of a vehicle
  - Issue of learners' licenses
  - Issue / renewal of driving licenses (non-transport vehicles).
  - Registration of new vehicles

- **Other Services at eSeva Centers**
  - Sale of passport application forms
  - Receipt of passport applications
  - Receipt of applications for new telephone connections
  - Registration Department: Sale of non-judicial stamps
  - Registration Department: Document writing service

UNIT- 5TH

e-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

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1. e- Government Systems Security:

The implementation of e-government is based on information technology, how to solve the security problem of the e-government system is becoming an extremely urgent subject. This paper, from the angle of security risk management, analyses the procedures of e-government security risk management from three aspects: risk identification, risk analysis, risk control. And the corresponding countermeasures are proposed. Nowadays, with the fast development of information technology; strengthening risk management is an effective way to guarantee the security of e-government system.

Challenges and Approach to e- Government Security

The e- Government Security Risks

The development of e-government, which is based on internet, meets fatal security problems due to the complexity and vulnerability of network. Generally speaking, the security risks e-government facing includes the following aspects:

1. **Information Intercepting.** It means that the related e-government users or invaders capture or steal the e-information from governments or other users.
2. **Information Tampering.** The internet attackers tamper, insert or delete original data through various technical methods, and transmit them to the destination, in order to damage the integrity of the data.
3. **Services Denial. I**t is the complete invalidation of the network system or the servers system in some period. It mainly comes from the attack of the hackers or the virus, and the man-made destruction of the devices as well.

4. **System Resources Stealing.** In the network system environment, the stealing of the system resources is very common.
5. **Information Faking.** It means that after the attackers know the rules of the data in the network information or after they have decoded the government information; they could pretend legal users or make false information to cheat other users. The main forms include pretending users to get illegal certifications, forging e-mails, etc.

The Procedures of Risk Management (Approaches to e- Government Security)

Risk management is a course which includes identifying risks, analysing risks, and drawing up risk management plans. The procedures of security risk management of e-government include three steps: risk identifying, risk analysing, and risk controlling.

1. **Risk Identifying.** The security requirements for the e-government system are confirmed by system evaluations of the risks. Risk identification is the first step of risk management in order to charge the security risks of e-government effectively. Risk identification is based on the collecting of various relevant threats, bugs and corresponding countermeasures, and then recognizes any possible risks or potential threats to the e-government system. There are many different kinds of methods to identify risks. The goal of risk identification is to recognize risks existing in network environment, in data or data exchange.

   One problem should be noticed is that risk identification cannot charge all the e-government system risks. Risk identification can only find the already known risks or potential risks which based on known risks. We use risk analysis and risk control to solve or reduce most other unknown risks.

2. **Risk Analysing.** Risk analysis, through various kinds of qualitative or quantitative methods, such as analysis, comparison, evaluation, etc. is to decide the importance of each factor of e-government risks, rank the factors, and then evaluate every possible result to the e-government system. Threat is a kind of potentiality which launched unintentionally by threat source, or threat source attacked the vulnerabilities of the system intentionally. It is that the system has vulnerabilities, so threat sources become risks. So in the process of risk analysis, we must identify and describe threat sources.

Threat sources can be any kinds of environments or events include people, nature, and so on, which do harm to the system. The natural threat that system facing relates to its geographical location; however, the threats from people may have no intention or on purpose. To identify threats the system facing, we can use many different methods, such as brainstorming, Delphi, Scenarios Analysis, etc.

3. **Risk Controlling.** Risk controlling is to choose and use some risk controlling methods to guarantee the risk can be reduced to an acceptable level. Risk controlling is the most important step in the risk management. It is the key factor to determine whether the risk management is successful or not. The goal of e-government security risk controlling is to reduce the risk degree which e-government projects suffering. Generally speaking, there are two kinds of risk controlling methods.

   First are risk controlling measures, such as risk reducing, avoiding, or transferring, and losses managing. We often use risk transferring and losses managing in e-government security risk management. Second kinds are measures funding for risk compensation, which include insuring, or taking risk by oneself. In e-government security risk management, managers need to decide which measures to choose- insuring or taking risk by their own. In addition, to make a proper choice, one should take risk costs into consideration. Of course, we cannot ignore other influences, such as government's reputations.

   Second, One effective and feasible risk controlling method for e-government security is establishing a whole security plan to reduce risk, mastering some basic technology for security guarantee, and preparing solutions that the government can adopt when specific security accidents happen.

2. Security Concerns in e- Commerce:

E-commerce is vulnerable to a wide range of security threats. Attacks against electronic commerce systems can disclose or manipulate proprietary information. The three general assets that companies engaging in electronic commerce must protect are client computers, computer communication channels, and Web servers.

Key security provisions in each of these parts of the Web client-Internet-Web server linkage are secrecy, integrity, and available service. Threats to commerce can occur anywhere in the commerce chain.

Security for Server Computers:

The server is the third link in the client–Internet–server electronic commerce path between the user and a Web server. Servers have vulnerabilities that can be exploited by anyone determined to cause destruction or acquire information illegally. One entry point is the Web server and its software. Other entry points include back-end programs containing data, such as a database and the server on which it runs. Although no system is completely safe, the Web server administrator's job is to make sure that security policies are documented and considered in every part of the electronic commerce operation.

Web servers are susceptible to security threats. Programs that run on servers have the potential to damage databases, abnormally terminate server software, or make subtle changes in proprietary information. Attacks can come from within the server in the form of programs, or they can come from outside the server. Backup copies of servers provide redundancy in the case of a physical threat to a server. The Web server must be protected from both physical threats and Internet-based attacks on its software. Protections for the server include access control and authentication, provided by username and password login procedures and client certificates. Firewalls can be used to separate trusted inside computer networks and clients from untrusted outside networks, including other divisions of a company's enterprise network system and the Internet.

- **Web Server Threats.** Web server software, is designed to deliver Web pages by responding to HTTP requests. A Web server can compromise secrecy if it allows automatic directory listings. The secrecy violation occurs when the contents of a server's folder names are revealed to a Web browser. This can happen when a user enters a URL, such as http:// www.somecompany.com/FAQ/, and expects to see the default page in the FAQ directory. The default Web page that the server normally displays is named index.htm or index.html. If that file is not in the directory, a Web server that allows automatic directory listings will display all of the file and folder

names in that directory. Then, visitors can click folder names at random and open folders that might not be intended for public disclosure. Careful site administrators turn off this folder name display feature. If a user attempts to browse a folder where protections prevent browsing, the Web server issues a warning message stating that the directory is not available.

- **Database Threats.** E-commerce systems store user data and retrieve product information from databases connected to the Web server. Besides storing product information, databases connected to the Web contain valuable and private information that could damage a company irreparably if disclosed or altered. Most database management systems include security features that rely on usernames and passwords. Once a user is authenticated, specific parts of the database become available to that user. However, some databases either store username/password pairs in an unencrypted table, or they fail to enforce security at all and rely on the Web server to enforce security. If unauthorized users obtain user authentication information, they can masquerade as legitimate database users and reveal or download confidential and potentially valuable information.

- **Other Programming Threats.** Web server threats can arise from programs executed by the server. Java or C++ programs that are passed to Web servers by a client, or that reside on a server, frequently make use of a buffer. A buffer is an area of memory set aside to hold data read from a file or database. A buffer is necessary whenever any input or output operation takes place because a computer can process file information much faster than the information can be read from input devices or written to output devices. Programs filling buffers can malfunction and overfill the buffer, spilling the excess data outside the designated buffer memory area. This is called a **buffer overrun** or buffer overflow error.

- **Threats to the Physical Security of Web Servers.** Web servers and the computers that are networked closely to them, such as the database servers and application servers used to supply content and transaction-processing capabilities to electronic commerce Web sites, must be protected from physical harm. For many companies, these computers have become repositories of important data (information about customers, products, sales, purchases, and payments). They have also become important parts of the

revenue-generating function in many businesses. As key physical resources, these computers and related equipment warrant high levels of protection against threats to their physical security.

Communication Channel Security

The Internet serves as the electronic connection between buyers (in most cases, clients) and sellers (in most cases, servers). The most important thing to remember about communication channel security is that the Internet was not designed to be secure. Today, the Internet remains largely unchanged from its original, insecure state. Message packets on the Internet travel an unplanned path from a source node to a destination node. A packet passes through a number of intermediate computers on the network before reaching its final destination. The path can vary each time a packet is sent between the same source and destination points. Because users cannot control the path and do not know where their packets have been, it is possible that an intermediary can read the packets, alter them, or even delete them. That is, any message traveling on the Internet is subject to secrecy, integrity, and necessity threats.

Communication channels, in general, and the Internet, in particular, are especially vulnerable to attacks. Encryption provides secrecy, and several forms of encryption are available that use hash functions or other more complex algorithms. They include private-key and public-key techniques. Integrity protections ensure that messages between clients and servers are not altered. Digital certificates provide both integrity controls and user authentication. Several Internet protocols, including Secure Sockets Layer and Secure HTTP, use encryption to provide secure Internet transmission capabilities. As wireless networks have grown to become important parts of the data communication infrastructure, security concerns have increased. Although many wireless networks (especially home networks) are installed without security features, wireless encryption methods that make them more secure are available. Most wireless networks installed in businesses today do have wireless encryption.

- **Secrecy Threats.** Secrecy is the security threat that is most frequently mentioned in articles and the popular media. Closely linked to secrecy is privacy, which also receives a great deal of attention. Secrecy and privacy, though similar, are different issues. Secrecy is the prevention of unauthorized

information disclosure. Privacy is the protection of individual rights to nondisclosure. Secrecy is a technical issue requiring sophisticated physical and logical mechanisms, whereas privacy protection is a legal matter.

One significant threat to electronic commerce is theft of sensitive or personal information, including credit card numbers, names, addresses, and personal preferences. This kind of theft can occur any time anyone submits information over the Internet because it is easy for an ill-intentioned person to record information packets (a secrecy violation) from the Internet for later examination.

- **Integrity Threats.** An integrity threat, also known as **active wiretapping**, exists when an unauthorized party can alter a message stream of information. Unprotected banking transactions, such as deposit amounts transmitted over the Internet, are subject to integrity violations. Of course, an integrity violation implies a secrecy violation because an intruder who alters information can read and interpret that information. Unlike secrecy threats, where a viewer simply sees information he or she should not, integrity threats can cause a change in the actions a person or corporation takes because a mission-critical transmission has been altered. Cybervandalism is an example of an integrity violation. Cybervandalism is the electronic defacing of an existing Web site's page i.e. replacing a Web site's regular content with his or her own content.

- **Necessity Threats.** The purpose of a necessity threat, which usually occurs as a **delay**, **denial**, or **denial-of-service (DoS)** attack, is to disrupt normal computer processing, or deny processing entirely. A computer that has experienced a necessity threat slows processing to an intolerably slow speed.

- **Threats to the Physical Security.** The Internet's packet-based network design precludes it from being shut down by an attack on a single communications link on that network. However, an individual user's Internet service can be interrupted by destruction of that user's link to the Internet.

- **Threats to Wireless Networks.** Networks can use wireless access points (WAPs) to provide network connections to computers and other mobile devices within a range of several hundred feet. If not protected, a wireless network allows anyone within that range to log in and have access to any

resources connected to that network. Such resources might include any data stored on any computer connected to the network, networked printers, messages sent on the network, and, if the network is connected to the Internet, free access to the Internet. The security of the connection depends on the Wireless Encryption Protocol (WEP), which is a set of rules for encrypting transmissions from the wireless devices to the WAPs.

Security for Client Computers

Client computers, usually PCs, must be protected from threats that originate in software and data that are downloaded to the client computer from the Internet. Active content delivered over the Internet in dynamic Web pages can be harmful. Another threat to client computers can arise when a malevolent server site masquerades as a legitimate Web site. Users and their client computers can be duped into revealing information to those Web sites.

- **Cookies.** The Internet provides a type of connection between Web clients and servers called a stateless connection. In a stateless connection, each transmission of information is independent; that is, no continuous connection (also called an open session) is maintained between any client and server on the Internet. Cookies are small text files that Web servers place on Web client computers to identify returning visitors. Cookies also allow Web servers to maintain continuing open sessions with Web clients. An open session is necessary to do a number of things that are important in online business activity. For example, shopping cart and payment processing software both need an open session to work properly.

  Cookies were invented to solve the stateless connection problem by saving information about a Web user from one set of server–client message exchanges to another. The third-party Web site providing the advertising is often interested in tracking responses to their ads by visitors who have already seen the ads on other sites. If the advertising Web site places its ads on a large number of Web sites, it can use persistent third-party cookies to track visitors from one site to another. The most complete way for Web site visitors to protect themselves from revealing private information or being tracked by cookies is to disable cookies entirely.

- **Web Bugs.** Some advertisers send images (from their third-party servers) that are included on Web pages, but are too small to be visible. A Web bug is a tiny graphic that a third-party Web site places on another site's Web page. When a site visitor loads the Web page, the Web bug is delivered by the third-party site, which can then place a cookie on the visitor's computer. A Web bug's only purpose is to provide a way for a third-party Web site (the identity of which is unknown to the visitor) to place cookies from that third-party site on the visitor's computer.

- **Active Content.** Active content refers to programs that are embedded transparently in Web pages and that cause action to occur. For example, active content can display moving graphics, download and play audio, or implement Web-based spreadsheet programs. Active content is used in electronic commerce to place items into a shopping cart and compute a total invoice amount, including sales tax, handling, and shipping costs. Developers use active content because it extends the functionality of HTML and moves some data processing chores from the busy server machine to the user's client computer. Unfortunately, because active content elements are programs that run on the client computer, active content can damage the client computer. Thus, active content can pose a threat to the security of client computers. The best-known active content forms are cookies, Java applets, JavaScript, VBScript, and ActiveX controls.

  One way to control threats from active content is to use digital certificates. A digital certificate or digital ID is an attachment to an e-mail message or a program embedded in a Web page that verifies that the sender or Web site is who or what it claims to be. Digital certificates are issued by a certification authority (CA). Two of the most commonly used CAs are Thawte and VeriSign, but other companies such as DigiCert, Entrust, GeoTrust, Equifax Secure, and RapidSSL.com also offer CA services.

- **JavaScript.** JavaScript is a scripting language developed by Netscape to enable Web page designers to build active content. When a user downloads a Web page with embedded JavaScript code, it executes on the user's (client) computer. Like other active content vehicles, JavaScript can be used for attacks by executing code that destroys the client's hard disk, discloses the e-mail stored in client mailboxes, or sends sensitive information to the attacker's Web

server. JavaScript code can also record the URLs of Web pages a user visits and capture information entered into Web forms. For example, if a user enters credit card numbers while reserving a rental car, a JavaScript program could copy the credit card number.

- **Graphics and Plug-Ins.** Graphics, browser plug-ins, and e-mail attachments can harbor executable content. Some graphics file formats have been designed specifically to contain instructions on how to render a graphic. That means that any Web page containing such a graphic could be a threat because the code embedded in the graphic could cause harm to a client computer. Similarly, browser plug-ins, which are programs that enhance the capabilities of browsers, handle Web content that a browser cannot handle.

  In 1999, The New York Times revealed that RealNetworks had been using its RealPlayer plug-in to gather information surreptitiously from users. Downloaded and installed easily from the Internet, RealPlayer was recording user information such as the RealPlayer user's name, e-mail address, country, ZIP code, computer operating system, and other details. RealPlayer used the Internet connection to send the information it had gathered back to RealNetworks.

- **Viruses, Worms, and Antivirus Software.** A virus is software that attaches itself to another program and can cause damage when the host program is activated. A worm is a type of virus that replicates itself on the computers that it infects. Worms can spread quickly through the Internet.

  The first virus to become major news in the mainstream media was the ILOVEYOU virus, also known as the "love bug," and its variants in 2000. Arrives attached to an e-mail message with the subject line "ILOVEYOU" and infects any computer on which the attachment is opened. It sends itself to addresses in any Microsoft Outlook address book it finds on the infected computer. The virus destroys music and photo files stored on the infected computers. When it was launched, it clogged e-mail servers in many large organizations and slowed down the operation of the entire Internet. The ILOVEYOU virus also searched for other users' passwords and forwarded that information to the original perpetrator. Within days, the virus spread to 40 million computers in more than 20 countries and caused an estimated $9 billion in damages—most of it in

lost worker productivity. In 2007, the Storm virus appeared. Storm appears as an e-mail message telling of an interesting news story with a related video clip included as an attachment. The attachment contains the virus, which allows a remote computer to take over the infected computers and form a botnet. Beginning in 2008 and continuing into 2009, a virus named Conficker has been extremely successful. Conficker is believed to have infected nearly 10 million computers.

Antivirus vendors and Microsoft have issued patches and updates that eradicate the virus, but it reinstalls itself and has proven to be quite resilient. Symantec and McAfee, among other companies, keep track of viruses and sell antivirus software. Antivirus software is only effective if the antivirus data files are kept current. The data files contain virus-identifying information that is used to detect viruses on a client computer. Because people generate new viruses by the hundreds every month, users must be vigilant and update their antivirus data files regularly so that the newest viruses are recognized and eliminated. Some Web e-mail systems, such as Yahoo! Mail, let users scan attachments using antivirus software before downloading e-mail.

- **Steganography.** The term steganography describes the process of hiding information (a command, for example) within another piece of information. This information can be used for malicious purposes. Frequently, computer files contain redundant or insignificant information that can be replaced with other information. This other information resides in the background and is undetectable by anyone without the correct decoding software. Steganography provides a way of hiding an encrypted file within another file so that a casual observer cannot detect that there is anything of importance in the container file. In this two-step process, encrypting the file protects it from being read, and steganography makes it invisible.

  Many security analysts believe that the terrorist organization *Al Qaeda* used steganography to hide attack orders and other messages in images that its confederates posted on Web sites in preparation for the attacks of September 11, 2001. Messages hidden using steganography are extremely difficult to detect.

- **Physical Security for Clients.** In the past, physical security was a major concern for large computers that ran important business functions such as payroll or billing; however, as networks (including intranets and the Internet) have made it possible to control important business functions from client computers, concerns about physical security for client computers have become greater. Many of the physical security measures used today are the same as those used in the early days of computing; however, some interesting new technologies have been implemented as well.

  Devices that read fingerprints are now available for personal computers. These devices, which cost less than $100, provide a much stronger protection than traditional password approaches. In addition to fingerprint readers, companies can use other biometric security devices that are more accurate and, of course, cost more. A biometric security device is one that uses an element of a person's biological makeup to perform the identification. These devices include writing pads that detect the form and pressure of a person writing a signature, eye scanners that read the pattern of blood vessels in a person's retina or the color levels in a person's iris, and scanners that read the palm of a person's hand (rather than just one fingerprint) or that read the pattern of veins on the back of a person's hand.

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References

A BIG 'Thank You!' to following persons/webs, for her/his/their efforts towards successful preparation of notes:

- ☺ Data ‘Units 3-4’; Provided by “Amit Rajpoot”.
- ☺ Data ‘Units 1-4’; Provided by “Deepak Gupta” & “Vinita Kushwah”.
- ☺ Data ‘Unit 4-5’; Provided by “Diksha Gupta”.
- ☺ Data ‘Units 4-5’; Provided by “Keerti Singh Narwariya”.
- ☺ Data ‘e-Seva’; Provided by “Rajat Batham”.
- ☺ Data ‘Units 1-4’; Provided by “Sukrati Dixit”.
- ☺ ‘Data Mining and Typesetting’; by “Dhyan”.
- ☺ ‘Electronic Commerce’ by “Gary P. Schneider”.
- ☺ ‘e-Commerce & e-Business’ by “Zorayda Ruth Andam”.
- ☺ ‘E-governence: Concept and Case Study’ by “C.S.R. Prabhu”
- ☺ ‘Value Chains Versus Supply Chains’ by “Andrew Feller”, “Dr. Dan Shunk”, and “Dr. Tom Callarman”.
- ☺ http://en.wikipedia.org/wiki/Main_Page.
- ☺ http://www.e-framework.org.
- ☺ http://www.google.co.in/.
- ☺ ‘Proofreading’; by Ankita Sharma & Diksha Gupta.
- ☺ To everyone else who has direct or indirect participation.

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Regards- Dhyan

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