# E-COMMERCE

**Structure**

1.10 References and Suggested Readings

## 1.1 INTRODUCTION

Electronic commerce is a process, which is happening with the help of Information and Communication Technologies. In order to see its evolution it is important to see how commerce itself evolved over a period of time. Payment mechanism in cyberspace is all about paying for goods and/or services ordered or consumed using modern means of information technology. Such payment mechanism in order to be accepted must have all the attributes of a widely accepted offline payment system.

## 1.2 OBJECTIVES

After studying this unit, you should be able to:

- Define the term e-commerce and make a distinction between e-commerce and e-business;
- Explain how e-commerce is a commercial transaction;
- Explain the different models of e-commerce;
- Analyze the future of e-commerce.
- Explain the meaning of electronic fund transfer (EFT) and how it works;
- Explain the different modes of EFT mechanism;
- Explain EFT as an important tool in online financial and banking networks and its crucial role in electronic settlement;
- Discuss the online payment mechanism in the form of credit cards, smart cards, electronic wallet, and digital certificates; and
- Describe the role of law in shaping the online payment mechanism.

# Lesson-15

## 1.3 E-COMMERCE EVOLUTION

As the society evolved the commercial practices also evolved. The barriers to trade were broken chiefly by the language and later by transport. The barter trade gave way to acceptance of bullion as the trading currency. With the passage of time nation states emerged as new political units and with new technological developments, like telegraph and telephone further facilitated the trade. For over a century these telecommunication devices became an integral part of the commercial enterprises all over the world.

Later, in the early 1960s, computers were increasingly used to disseminate information across geographical space. Though telegraph, telephones, telex and facsimile were still the relied upon options, nevertheless the big corporations opted for Electronic Data Interchange (EDI). It refers to the process by which goods are ordered, shipped, and tracked computer-to-computer using standardized protocol.

EDI permits the "electronic settlement and reconciliation of the flow of goods and services between companies and consumers".

EDI saves money because the computer, and not an office staff, submits and processes orders, claims, and other routine tasks.

EDI began in the 1960s as a computer-to-computer means of managing inventory, bill presentment, shipment, orders, product specifications, and payment. EDI is made possible because trading partners enter into master agreements to employ electronic messaging permitting computer-to-computer transfers of information and validating computer-to-computer contracts.

The early adopters of EDI were companies running complex operations in the airlines, shipping, railways and retail sectors. These companies developed their own proprietary format for interchanging data messages. It led to development of proprietary systems. These proprietary systems whether of a retail or automobile company were operation specific. It was felt that a universal standard was

impractical and unnecessary. Consequently, the lack of universal standards made it difficult for companies to communicate with many of their trading partners.

In late 1970s, the American National Standards Institute (ANSI) authorized a committee called the Accredited Standards Committee (ASC) X-12 (consisting of government, transportation, and computer manufacturers) to develop a standard between trading partners. The standard was called ANSI X-12. Over a period of time sectors like paper, chemical, warehouse, retail, telecommunications, electronics, auto, metals, textile, and aerospace developed and started using sector specific EDI standards, which are subset of X12 standards.

Under the aegis of United Nations, organizations from different sectors collaborated and developed an internationally approved standard structure for transmitting information between different trading partners, called the United Nations Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT) in 1986. It ensures transmission compatibility of electronic business documents globally. In the US companies tend to use ANSI X-12 protocol while their European counterparts prefer EDIFACT. Moreover, various industry sectors use their industry-specific protocols.

The EDI was like a business-to-business (B2B) model involving a company and its various vendors performing commercial transactions using proprietary networks. By late 1980s computers acquired the status of 'personal computer', i.e. became part of the private domain of an individual. It was EDI at the individual level supported by the public networks known as Internet. Hence, e-commerce evolved out of EDI and should be considered as a next logical step in the development of commercial processes involving commercial transactions. Thus e-commerce means doing business electronically across the extended enterprise. It covers any form of business or administrative transaction or information exchange that is executed using any information and communications technology.

Narrowly put, e-commerce is limited to specific initiatives, such as sales via the Internet, electronic procurement, or electronic payment.

Self Assessment Question 1

Trace the evolution of E-commerce.

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## DEFINING E-COMMERCE

It is important to note that phrases, like 'e-business', 'e-commerce', Internet business, Net commerce etc. are commonly being used these days. Thus for the sake of clarity e-commerce should be distinguished from e-business. In fact, e-commerce is a subset of e-business.

### 1.4.1 Difference between E-commerce and E-business

E-business refers to all aspects of a business where technology is important. This may include knowledge management, design, manufacturing, R&D, procurement, finance, project planning, human resource planning and the related activities. E-commerce is that part of e-business that relates directly to sales & marketing. That is, e-commerce is part of the all-encompassing world of e-business. E-business is a wider concept that embraces all aspects of the use of information technology in business. It includes not only buying & selling but also servicing customers and collaborating with business partners and often involves integration across business processes & communication within the organization.

### 1.4.2 E-commerce Definitions

As the Internet makes way for new business transactions via its complex telecommunications network, it is difficult to provide a single all encompassing definition of e-commerce. It means different to different people. Thus it would be

prudent to look into various definitions of e-commerce to comprehend e-commerce and its different characteristics:E-commerce

## 1.4.2.1 E-commerce: A Commercial Transaction

E-commerce defined simply, is the commercial transaction of services in an electronic format. In general terms, e-commerce is a business methodology that addresses the needs of organizations, traders and consumers to reduce costs while improving the quality of goods and services and increasing the speed of service delivery. It refers to all forms of transactions relating to commercial activities, including both organizations and individuals that are based upon the processing and transmission of digitized data, including text sound and visual images. A broad definition of e-commerce is: "The marketing, promoting, buying & selling of goods electronically, particularly via the Internet", which encompasses, interalia, "e-tailing (virtual shop fronts), EDI, which is B2B exchange of data; e-mail & computer faxing; [and] B2B buying and selling3".

A narrower definition is "the trading of goods and services in which the final order is placed over the Internet". The Office of Tax Policy at the US Department of Treasury defines e-commerce most broadly as any transaction that occurs with the facilitation of electronic "tools and techniques". The Internet Tax Freedom Act (ITFA), 1998, on other hand provides the only legal definition of e-commerce as "any transaction conducted over the Internet or through Internet access, comprising the sale, lease, license, offer or delivery of property, goods, services or information, whether or not for consideration, and includes the provision of Internet access".

The US Census Bureau measures e-commerce by looking at "the value of goods and services sold online whether over open networks such as the Internet, or over proprietary networks running systems such as EDI4".

According to European Commission, e-commerce encompasses more than the purchase of goods online. It includes a disparate set of loosely defined behaviours,

such as shopping, browsing the Internet for goods and services, gathering information about items to purchase and completing the transaction. It also involves the fulfillment and delivery of those goods and services and inquiries about the status of orders. Like any other sustained business activity it also means conducting consumer satisfaction surveys, capturing information about consumers and maintaining consumer databases for marketing promotions and other related activities. Interestingly, its Directive on E-commerce (2000/31/EC) defined the term 'commercial communication' instead of defining 'E-commerce'. Article 2(f) defined 'commercial communication' as any form of communication designed to promote, directly or indirectly, the goods, services or image of a company, organization or person pursuing a commercial, industrial or craft activity or exercising a regulated profession.

The Gartner Group5 defines e-commerce as an evolving set of:

(a) Home-grown or packaged software applications that link multiple enterprises or individual consumers to enterprises for the purpose of conducting business.

(b) Business strategies aimed at optimizing relationships among enterprises and between individuals and enterprises through the use of information technologies.

(c) Business processes (such as procurement or selling or order status checking or payment) that, by definition, cross boundaries, and

(d) Technologies and tools that enable these applications, strategies and processes to be implemented and realised.E-commerce: Evolution, Meaning and Types

## 1.4.2.2 E-commerce & WTO

Interestingly, the World Trade Organization (WTO) Ministerial Declaration6 on E-commerce defines e-commerce as "the production, distribution, marketing, sales or delivery of goods and services by electronic means". The six main instruments of e-commerce that have been recognised by WTO are telephone, fax, TV, electronic

payment & money transfer systems, EDI and Internet. In other words, e-commerce can be conducted over telephones, fax machines, automatic teller machines (ATMs), electronic payment systems such as prepaid telephone cards, electronic data interchange (EDI), television and the Internet. That means activities like, bookingan order over telephone, sending invoices over fax, ordering from shopping networks as advertised on TV etc. amount to indulging in e-commerce activities. It is laudatory on the part of WTO to have provided a very wide definition of e-commerce; it is understandable as WTO member consists of developed, developing and the least developed countries (LDCs).

The growing importance of electronic commerce in global trade led the Members of the WTO to adopt a declaration on global electronic commerce on 20 May 1998 at their second Ministerial Conference in Geneva, Switzerland. The declaration directed the General Council of the WTO to establish a comprehensive work programme to examine all trade-related issues arising from electronic commerce, and to present a report on the progress of the work programme at the third Ministerial Conference of the WTO. The declaration setting up the work programme included the statement that "Members will continue their current practice of not imposing customs duties on electronic commerce". The work programme was adopted by the WTO General Council on 25 September 1998. Subsequently, under the auspices of the General Council on June 15, 2001, WTO Members Governments identified three types of transactions on the Internet:

- Transactions for a service, which is completed entirely on the Internet from selection to purchase and delivery.
- Transactions involving "distribution services" in which a product, whether a good or a service, is selected and purchased on-line but delivered by conventional means.
- Transactions involving the telecommunication transport function, including provision of Internet services.

That is, the stress is on using low cost technology application, i.e. Internet for managing and facilitating the entire chain of commercial processes. Web makes it possible to dispense with the normal value chain for retailing, through direct sales by manufacturing to consumers. It can create new points on the value chain, such as Internet portals that act as shopping malls or aggregators that offers a new way of amassing buying power.

Self Assessment Question.

What are the different modes by which e-commerce be conducted?

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# Lesson-16

## 1.5 TYPES OF E-COMMERCE MODELS

Regardless of how narrowly or broadly e-commerce is defined, e-commerce occurs in various forms and between various entities in the market. It is necessary to consider the various forms that Internet commerce embodies in order to understand the implications for taxation. E-commerce can be categorised in four ways:

(1) business to business (B2B); (2) business to consumer (B2C); (3) consumer to business (C2B); and (4) consumer to consumer (C2C).

Table 1: E-commerce Models Matrix


Business Consumer

Business  B2B

www.vendome.niit.com

B2C

www.indiatimes.com

Consumer  C2B

www.makemytrip.com

C2C

www.ebay.in

These models represent 'online' commercial transactions and are comparable to their 'offline' counterparts. In other words, all these online models have adopted the functionalities of 'brick and mortar' (offline) companies and are being identified as 'click and mortar' companies. Clicks have replaced the bricks for faster, efficient and effective commercial transactions. Take a case of Dell computers. One can purchase a Dell computer or a server by visiting the site: www.dell.co.in and clicking on the desired computer or server configuration. Dell computers cannot be purchased from physical shops. One has to visit its site to purchase. Dell in a way has done away with bricks in favour of clicks. Moreover, these new business models are creating immense economic value by offering huge variety of products and service online. Amazon offers 57 times as many titles as a typical large bookstore stocks. This is often referred to as "long-tail" phenomenon: books that once lacked a market can be shifted at any time off Amazon's virtual shelves. It has been estimated that in 2000 the value of online sales of books that were not available at a typical bookstore was $ 578 million.

### 1.5.1 Business-to-Business (B2B)

It is a new name given to EDI. As the name suggests, it is a business platform involving two independent or even dependent business entities. In B2B version of online transaction(s) the manufacturing organization takes a lead in setting up a business platform. This platform acts a business communication channel between

the manufacturing/software developer entity and its vendors/suppliers, i.e., whatever was being done earlier in offline manner are now being done online. This may include registration of vendors, invitation of quotations, negotiations, price settlement, contract finalisation, procurement, cargo tracking, and payments – online. Thus a B2B platform acts as a business facilitator, negotiator and dealmaker, which facilitates, negotiates and clinches deal between independent or dependent business units.

## 1.5.2 Business-to-Consumer (B2C)

It refers to a business platform, involving a business entity and consumers. It is a retail version of e-commerce known as e-tailing. Selling goods or services through web based shops. It is the most popular model of e-commerce as it has helped moving commercial transactions from public domain to private domain. B2C is about creating a better offline shopping experience – online. It has benefit for both the business entity and consumer. E-tailing is a cheaper option as it is cheaper to set up a single website and warehouse combination than operate a chain of shops. From the point of consumer benefits are in the form of convenience, wider choice and time saver. From the consumer's point of view, online shopping is a great leveler. One can shop at any time (24×7), from anywhere, i.e. all consumers are to be treated equally online. It has made shopping a great fun!

## 1.5.3 Consumer-to-Business (C2B)

It is an innovative retail-marketing platform, where a business entity offers a variety of packages or options to entice the online customer. Here the business entity/service provider bids for consumer. It is often referred to as 'reverse auction'. Such models are widely prevalent in tourism and travel industry. The tour operators, hotels and airlines not only give deep discounts to the consumers but also give them option to negotiate the prices. It is a pro-active version of e-commerce as it offers deals, packages or bundle of products at competitive prices. Interestingly, its major success has come by the adoption of this model by the

business entities – mainly the manufacturers. This process of reverse auction has resulted into major savings for the manufacturers, as suppliers bid for the purchase orders, offering discounts in the process.

## 1.5.4 Consumer-to-Consumer (C2C)

It represents a consumer business platform, which is for the consumer, by the consumer. It is referred to as online 'consumer-to-consumer' auctions. Almost anything can be offered on such online platforms. A buyer who wants a particular item enters the maximum amount he is prepared to pay. This remains a secret to other bidders while auction site's computers monitor the bidding. Highest offer is accepted until the end of auction. Highly popular online auction sites, like eBay also provides services where bidders may even check the reliability of a seller, how he has been rated by other buyers by reading comments left by people who have done business with him before. Once a bid has been won, the two sides contact each other, the buyer pays and the seller sends the goods. Payments can be made online as well. PayPal, an online payments company supports eBay buyers. This is an improvement over traditional selling or auction processes in terms of convenience and volume of goods being auctioned.

To begin with, these models were nothing but the online version of successful offline E-commerce businesses. Apart from these 'pure' business models, some 'necessity' business models have also occupied Internet space. These business models occupy the 'niche service' areas. For example, Yahoo! Hotmail, Rediff, AOL etc. fulfill the need of an electronic post office; search engines providing directory services; and government websites for facilitating better government-to-citizen or government-to-business interface. Interestingly, with the passage of time these online models have also matured. A B2C model is no longer a 'business-to-consumer' model, it is integrating functionalities of other models like C2C or C2B also. It is far easier for a website that is successful at selling one product to branch into others. For example, Amazon has moved from selling books only to selling sea

foods and other products as well. It is now hosting auctions, and courting eBay traders. Similarly, eBay is no longer a C2C platform but is also selling goods at fixed price, like e-tailer, B2C. Online market place is more dynamic and ready for all kinds of innovation. Yahoo! has made so many recent changes to its business that it is being called "the new google", while Google is using it's advertising formula to steer specialist buyers straight to specialist online sellers. Online businesses have to keep on reinventing themselves to remain successful. E-entrepreneurs have to have an open mind about the future. In a way, the Internet has opened up opportunities to be very creative in the design of the business model. The success of e-commerce models is built around managing supplies, partners and customers effectively and efficiently. E-commerce is more customers oriented than its offline counterpart. The offline world was one where producers said to customers: "I have made this; buy it from me at this price". In the online world, customers are saying, "I want this; sell it to me at this price". Online world allows things like customer aggregation & auctions to be done in ways that are impossible in the physical world. Internet as a strong price-deflation mechanism: raising your prices is harder when your customers instantly compare them with everyone else. Price & product comparisons have been made easier by the development of "shopping bots". Websites like, Mysimon.com & Dealpilot.com enable buyers quickly to compare products, prices and availability.

**Self Assessment Question.**

Mention the different models of E-commerce.

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## 1.6 E-COMMERCE: THE FUTURE

E-commerce is growing. It is a reality and part of everyday life. Economies ofscale and scope are also easier to obtain online than offline. The biggest boost ofE-

commerce: Evolution, Meaning and Types e-commerce over the next few years will come not from snazzier websites or snappier marketing but from the proliferation of broadband Internet connections. Mobile phones and a host of other electronic devices are now being hooked to the web, ousting the personal computer from its monopoly position in providing Internet access.

As desktop (PC) access will increasingly migrate to the mobile environment, it would be more of m-commerce (mobile commerce) than e-commerce. Technological advances would make the commercial transactions further personalised. And as the numbers of customers who shop, grow, the business will scale, bringing in a lower cost structure.

# Lesson-17

## 2.3 ELECTRONIC FUND TRANSFER (EFT)

Electronic Fund Transfer means transferring money from one bank account to another in the same (intra bank) or different bank branches (inter bank). EFT has been in use since 1960s when banks first started using proprietary EDI network to share banking information. This was later converted into automated clearing houses. At a global level, to facilitate faster fund transfer between the remitter and beneficiary, the payment instructions are sent through telex, SWIFT1  (Society for Worldwide Interbank Financial Telecommunications), Wire Transfer, CHIPS2 (Clearing House Interbank  Payment System) etc. But when it comes to transfer of funds domestically, the options have been restricted to demand draft, mail transfer or telegraphic transfer.

## 2.3.1 How Electronic Fund Transfer Works?

Electronic fund transfer implies transfer of money using Internet technologies. This involves participation of payer and payee and their respective banks including an automated clearing house.

Step 1: Payee submits the cheque to his bank

Step 2: Payee's bank presents the cheque to the automated clearing house

Step 3: Automated clearing house informs the drawer's bank

Step 4: Drawer's bank clears the cheque

Step 5: Payee receives the payment

PAYEE

PAYEE's

BANK

INTERNET

DRAWER's

BANK

DRAWER

AUTOMATED

CLEARING

HOUSE

Figure 1: EFT mechanism using InternetPayment Mechanism in

In India, electronic fund transfer system has got a fillip when the Central Government amended the Negotiable Instruments Act, 1881 and brought in forth the Negotiable Instruments (Amendment and Miscellaneous Provisions) Act, 2002, and introduced the concept of a "truncated cheque" in section 6 (b) of the said Act:

Section 6(a) " a truncated cheque" means a cheque which is truncated during the course of a clearing cycle, either by the clearing house or by the bank whether

paying or receiving payment, immediately on generation of an electronic image for transmission, substituting the further physical movement of the cheque in writing.

Explanation II. – For the purposes of this section, the expression "clearing house" means the clearing house managed by the Reserve Bank of India or a clearing house recognised as such by the Reserve Bank of India.

As evident from the aforesaid section, the truncation process involves replacing physical cheques with their electronic images, which will travel through the stages of the clearing cycle. During the whole process of truncation the instrument would remain with the collecting bank.

### 2.3.2 Different Mode of EFT Mechanism

Over the period of time, the Reserve Bank of India (RBI) has taken various initiatives to introduce technology to facilitate electronic fund transfer at both corporate and retail banking level. For example, electronic settlement in the form of the electronic funds transfer services – Electronic Clearing Services (ECS), i.e., Credit Clearing and Debit Clearing and retail Electronic Funds Transfer (EFT) system has been a great success. In 2003-2004, the value of cheque transactions shrunk 16%, while settlements through the ECS3 jumped 200%. Further, it has introduced Centralised Funds Management System (CFMS), Securities Services System (SSS), Real Time Gross Settlement System (RTGS) and Structured Financial Messaging System (SFMS) to transform the existing systems into a state-of-the-art payment infrastructure in India.

### 2.3.3 The Electronic Clearing Services (ECS)

The Electronic Clearing Services (ECS) 'credit scheme' and the Electronic Clearing Services (ECS) 'debit scheme' are two activity lines, which have become important vehicles for furthering improvements in customer services. In ECS – credit, a series of electronic payment instructions are generated to replace the paper instruments. The system works on the basis of a single debit transaction triggering

a large number of credit entries. These credits or the electronic payment instructions which possess the details of the beneficiary's account number, amount and bank branch, are then communicated to the bank branches through their respective service branches for crediting the accounts of the beneficiaries either through magnetic media duly encrypted or through hard copy. ECS – debit is meant for payment of charges to utility services such as electricity, telephone companies, payment of insurance premia and loan installments etc. by customers. ECS – credit, has become popular and is being availed of by most corporate entities and official bodies.E-commerce

**Self Assessment Question.**

The two activity lines which have become important vehicles for furthering improvements in customer services are ......................and ......................

### 2.3.4 RBI EFT

RBI EFT – a scheme introduced by RBI to help banks offer their customers money transfer service from account to account of any bank branch to any other bank branch has widened its reach to more than 150 centres in the country. RBI EFT system is an inter-bank oriented system, wherein RBI acts as an intermediary between the remitting bank and the receiving bank and effects inter-bank funds transfer. The customers of banks can request their respective branches to remit funds to the designated customers irrespective of bank affiliation of the beneficiary.

### 2.3.5 INFINET

The setting up of the apex-level National Payments Council in May 1999 and the operationalisation of the Indian Financial Network (INFINET) by the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad have been some important developments in the direction of providing a communication network for the exclusive use of banks and financial institutions. INFINET

members include RBI, Public sector banks, Private banks, Foreign banks, Cooperative banks and Financial Institutions.

## 2.3.6 Structured Financial Messaging System (SFMS)

At the base of all inter-bank message transfers using the INFINET is the Structured Financial Messaging System (SFMS). It would serve as a secure communication carrier with templates for intra-bank and inter-bank messages in fixed message formats that will facilitate straight 'through processing'. All inter-bank transactions would be stored and switched at the central hub at Hyderabad while intra-bank messages will be switched and stored by the bank gateway. Security features of the SFMS would match international standards.

## 2.3.7 Real Time Gross Settlement System (RTGS)

It is significant to note that the RTGS system in banking sector has the potential to emerge as a major payment mechanism in India. Through this system both processing and final settlement of fund transfer instructions can take place in real time. It would help banks to scale up transactions that they have been processing. When fully implemented, RTGS would pave the way for a paperless money transfer mechanism. It would facilitate payment/receipt of funds without going through the traditional mode of pay order/demand draft/mail transfer/telegraphic transfer, which takes two to seven days to real time transactions. RTGS apart from providing a real time funds settlement environment has also become critical to an effective risk control strategy. The risks inherent in a net settlement system are well known. Payment system risks in a net settlement system are such that the default by one bank may lead to a 'knock-on' or domino effect to the system. Gross settlement reduces the risk significantly, as transactions are settled one by one on a bilateral basis in a real time mode.Payment Mechanism in Presently, RBI is aiming to give legal sanctity to the whole EFT system by bringing legislation on the Electronic Funds Transfer and its role in electronic settlement. Moreover, it has suggested

numerous amendments in the: Bankers' Book Evidence Act, the Negotiable Instruments Act, the Banking Regulation Act and the RBI Act.

## 2.4 ONLINE PAYMENT MECHANISM

Plastic money, i.e. credit cards has already made a presence in India and is fast becoming online shoppers' choice4 . Credit cards have registered a slow but steady growth in India. All the major banks, both public and private sectors, use the major international brand names like VISA and MASTERCARD. The most recent trend is to issue multipurpose cards which function as credit cards, debit cards or Automatic Teller Machines (ATM) cards. This is essentially to enable the holder to exercise a choice of payment option.

### 2.4.1 How Online Payment Mechanism Works?

Online business requires a website (Sub merchant) which acts as a kind of e-shop for the users. It gives details of products (or services). A customer can buy any of the products listed on such a website by making payment against the same either in cash or cheque or through the route of online payment namely credit card/debit card/net banking. The sub-merchant's are linked to a Payment Gateway facility provided by a Master Merchant, which works in association with a Payment Gateway Bank, which is further linked to VISA or MASTERCARD – the Credit Card Companies. To illustrate the mechanism, when a prospective customer visits a website (of a Sub-merchant) on Internet and selects a product he intends to buy, he is redirected to the website of Master Merchant (Payment Gateway) where the customer feeds all his details like name, credit card number, billing address etc. and completes the transaction by making the payment online. The Master Merchant at its end analyze the details of credit card holder (name, address, phone number, IP address etc.) and forwards the request to the Payment Gateway Bank and to Credit Card Companies. Depending on the report generated, the Master Merchant accepts or rejects the purchase order of the customer. Acceptance would lead to the

customer account being debited by the same amount and the sub-merchant would be required to dispatch the ordered goods to the customer's address.

Sub-merchant

www.xyz.com

Master Merchant

www.abc.com

Payment Gateway Bank

Master/Visa Card

Figure 2: Online payment mechanism using credit card

Apart from credit card based transactions, other online payment systems include:

## 2.4.2 Electronic Cash

E-cash is a pre-paid system. Consumers buy electronic tokens and build up electronic funds for use over the Internet. It is stored in an electronic device such as a chip card or computer memory. The person who has purchased such cash can use it online for making payments. It is also known as cyber cash5.

## 2.4.3 Electronic Wallets

E-wallets can be useful for making a series of micro payments online for example, downloading MP3 music file, paying for an online article etc. A mechanism is necessary that ensures that the transaction costs of collecting payment for such items do not exceed the value of the transaction. A software wallet requires a user to set up an online account to which heads an amount of money. When transactions are undertaken, the wallet is debited6.

## 2.4.4 Smart Card

Smart cards use a micro controller chip embedded in the card. The cards can be purchased and reloaded again and again. It works as an electronic purse storing digital money, which could be used over public terminals (Websites, ATMs, Telephone lines) etc. Another example of smart card is the Stored Value Cards (pre-paid SIM cards for mobile phones).

### 2.4.5 Digital Cheques

It is a cheque in the electronic form. Here, the consumer uses his digital signatures to sign an e-cheque. The consumer fills in the cheque online and then sends it via a secure server to the recipient. The amount specified on the cheque is electronically withdrawn from the sender's account and deposited in the recipient's account.

### 2.4.6 Digital Signature

It is a mechanism to ensure authenticity, message integrity, non-repudiation and confidentiality of an electronic record. It is based on asymmetric crypto-system, which uses a private key to encrypt, and a public key to decrypt messages. A digital signature regime requires a trusted third party – Certifying Authority (CA) to verify and authenticate the identity of a subscriber (a person in whose name the Digital Signature Certificate is issued). These days, even smart cards may contain digital signatures of a subscriber.

**Self Assessment Question.**

Define digital signature.

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### 2.4.7 Digital Certificates

Digital certificates are like trust certificates developed by a consortium led by MasterCard and Visa. These digital certificates provide Secure Electronic

Transaction (SET) to the users. SET allows a purchaser to confirm that the merchant is legitimate and conversely allows the merchant to verify that a credit card is being used by its owner. It also requires that each purchase request include a digital signature, further identifying the cardholder to the retailer. SET is an improvement over SSL (Secure Sockets Layer) encryption method. SSL uses a private key to encrypt data that is then transmitted over the SSL connection. It is used to encrypt customer and credit card information when it is transmitted across the Internet. The message 'You are about to view information over a secure connection', is an indication that SSL is in use. Websites protected by SSL also carry a security symbol in the status bar, often in the form of a closed lock7.

A key difference between SSL and SET lies in the allocation of risk. SET makes the buyer responsible for proving her credentials, whereas, with SSL, the merchant takes responsibility for checking the buyer's ability to pay and that the credit card account being referenced belongs to the user initiating the transaction8.

**Self Assessment Question.**

The difference between SSL and SET lies in........................................

# Lesson-18

## 2.5 ONLINE PAYMENTS AND THE INFORMATION TECHNOLOGY ACT, 2000

The Information Technology Act, 2000 is a facilitating as well as an enabling Act. It facilitates e-commerce by enabling a digital signature regime. It is important to note that a digital signature regime not only authenticates electronic records but also plays an important role in electronic fund transfer.

## 2.5.1 Online Payments and Negotiable Instruments

When the Information Technology Act, 2000 came into effect on October 17, 2000 it was non-applicable to the negotiable instruments, like promissory note, cheque and bill of exchange but subsequently to facilitate e-commerce related transactions, the Central Government amended the Negotiable Instruments Act, 1881 and brought in forth the Negotiable Instruments (Amendment and Miscellaneous Provisions) Act, 2002 to recognise "a cheque in the electronic form" (e-cheque) and "a truncated cheque". Therefore, to facilitate e-commerce related transactions, creation and acceptability of 'e-cheque' (a signer uses his digital signatures to sign an e-cheque) and payment or receipt on the basis of an electronic image of a 'truncated cheque' are now legally valid. Still, the negotiable instruments, like promissory note and bill of exchange are considered non-applicable under the Act.

Further banking transactions in India are being regulated by the Indian Central Bank – the Reserve Bank of India (RBI). Banks, which are going for e-cheque and truncated cheque facilities, have their secured proprietary IT networks in place conforming to the guidelines issued by the RBI from time to time on network banking. For example, "Punjab National Bank" (PNB) was among the first banks to deploy the first image-based cheque clearing system in India. This provided clearance of inter-city cheques within 48 hours after the cheque is presented, at selected centres using cheque truncation, where there is image based cheque clearing system. Earlier it took about 15-20 days for clearance of outstation cheques. PNB was the first bank to launch the Intra Bank Inter City Cheque truncation project by using NCR's ECPIX (Electronic Cheque Presentment with Image Exchange) technology. After a successful pilot run the system was

introduced by connecting MICR Centres located at Lucknow, Nagpur, Jaipur, Kanpur, Ludhiana, Chandigarh, Jalandhar, Agra, Allahabad and Varanasi.

## 2.5.2 Establishment of Public Key Infrastructure (PKI)

The Information Technology Act, 2000 gives a legal mandate to the use of digital signatures to protect confidentiality of data protection. It is based on "asymmetric crypto system" [Section 2(1)(f)], wherein two different keys are used to encrypt and decrypt the electronic records. A private key is used to encrypt an electronic record and a public key is used to decrypt the said record. Private key is kept confidential and is to be used by the signer (subscriber) to create the digital signature, whereas the public key is more widely known and is used by a relying party to verify the digital signature and is listed in the digital signature certificate. The subscriber's public key and private key constitute a functioning key pair. In an asymmetric crypto system, a private key is mathematically related to public key and it is computationally impossible to calculate one key from the other. Hence the private key cannot be compromised through knowledge of its associated public key. It calls for establishment of a Public Key Infrastructure (PKI), which is based on mutual trust involving subscribers, Certifying Authorities and the Controller of Certifying Authorities (CCA). Public Key Infrastructure (PKI) represents a set of policies, processes, server platforms, software and workstations used for the purpose of administering Digital Signature Certificates (DSCs) and public-private key pairs, including the ability to generate, issue, maintain, and revoke public key certificates. The Information Technology Act, 2000 provides for a statutory environment for establishment of a PKI to administer DSCs. It has provisions related to powers and functions of the Controller of Certifying Authorities [Sections 17-34 of The Information Technology Act], Certifying Authorities [Sections 35-39 of The Information Technology Act] and Subscribers [Sections 40-42 of The Information Technology Act]. The Controller of Certifying Authorities is a public body and acts as a regulator, whereas the Certifying Authorities could be

any person, who fulfills all the licensing conditions put forth by the Controller of Certifying Authorities. The success of this PKI model can be gauged from the fact that presently, in India there are seven licensed Certifying Authorities, namely, Safescrypt, Institute for Development & Research in Banking Technology (IDRBT), Tata Consultancy Services (TCS), National Informatics Centre (NIC), Mahanagar Telephone Nagar Limited (MTNL), (n) Code Solutions Ltd. and Department of Customs and Excise. Moreover, it is important to note that most of these Certifying Authorities are quite active in both businesse-to-consumer (B2C) and business-to-business (B2B) domain. For example, TCS is issuing DSCs for online Tax Filing, Northern Railway e-procurement, ONGC e-procurement etc.; MTNL is issuing free DSCs to MTNL Broadband customers; Safescrypt is issuing DSCs for EXIM (Export-Import)Payment Mechanism in purposes to vendors dealing with the Directorate General of Foreign Trade and (n) Code Solutions Ltd. is issuing DSCs to Northern Railway vendors (e-procurement).

**Self Assessment Question.**

PKI is based on ............................. system.

## 2.6 FUTURE OF E-MONEY

The growth of e-commerce depends on effectiveness and acceptability of online payment mechanisms. Newer technologies are making online world a safer, convenient and cost effective medium to do monetary transactions. What would be the result of these technological advances, replacing money with digital cash? This gradual e-monitisation can shrink cash demand and may affect the money supply and rate of interest in the long term. It will also restrict RBI's ability to conduct open market operations. The current trends, involving e-monitisation transactions through credit cards and Internet will require monetary policy to take not of the ongoing revolution in the payments and settlement system9. According to RBI the spread of e-monitisation does not require monetary and financial aggregates to be redefined, as long as transactions take place through the banking channel.

However, e-money instruments, like credit cards, debit cards and stored-value cards have a potential to bypass the banking channels altogether and serve as parallel money suppliers.

# Lesson-19

## ERP AND CRM

**Customer relationship management**

**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.[1] 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.[2] Customer relationship management describes a company-wide business strategy including customer-interface departments as well as other departments.[3] Measuring and valuing customer relationships is critical to implementing this strategy.[4]

**Benefits of CRM**

A CRM system may be chosen because it is thought to provide the following advantages:[citation needed]

- Quality and efficiency
- Decrease in overall costs
- Decision support
- Enterprise agility
- Customer Attention

**Challenges**

Successful development, implementation, use and support of customer relationship management systems can provide a significant advantage to the user, but often,

there are obstacles that obstruct the user from using the system to its full potential. Instances of a CRM attempting to contain a large, complex group of data can become cumbersome and difficult to understand for an ill-trained user.

Additionally, an interface that is difficult to navigate or understand can hinder the CRM's effectiveness, causing users to pick and choose which areas of the system to be used, while others may be pushed aside. This fragmented implementation can cause inherent challenges, as only certain parts are used and the system is not fully functional. The increased use of customer relationship management software has also led to an industry-wide shift in evaluating the role of the developer in designing and maintaining its software. Companies are urged to consider the overall impact of a viable CRM software suite and the potential for good or harm in its use.

**Complexity**

Tools and workflows can be complex, especially for large businesses. Previously these tools were generally limited to simple CRM solutions which focused on monitoring and recording interactions and communications. Software solutions then expanded to embrace deal tracking, territories, opportunities, and the sales pipeline itself. Next came the advent of tools for other client-interface business functions, as described below. These tools have been, and still are, offered as on-premises software that companies purchase and run on their own IT infrastructure.

**Poor usability**

One of the largest challenges that customer relationship management systems face is poor usability. With a difficult interface for a user to navigate, implementation can be fragmented or not entirely complete.

The importance of usability in a system has developed over time.[5] Customers are likely not as patient to work through malfunctions or gaps in user safety,[6] and there is an expectation that the usability of systems should be somewhat intuitive: "it helps make the machine an extension of the way I think — not how it wants me to think."

An intuitive design can prove most effective in developing the content and layout of a customer relationship management system.[7] Two 2008 case studies show that the layout of a system provides a strong correlation to the ease of use for a system and that it proved more beneficial for the design to focus on presenting information in a way that reflected the most important goals and tasks of the user, rather than the structure of the organization.[8] This "ease of service" is paramount for developing a system that is usable.[9]

In many cases, the growth of capabilities and complexities of systems has hampered the usability of a customer relationship management system. An overly complex computer system can result in an equally complex and non-friendly user interface, thus not allowing the system to work as fully intended.[10] This bloated software can appear sluggish and/or overwhelming to the user, keeping the system from full use and potential. A series of 1998 research indicates that each item added to an information display can significantly affect the overall experience of the user.[11]

**Fragmentation**

Often, poor usability can lead to implementations that are fragmented — isolated initiatives by individual departments to address their own needs. Systems that start disunited usually stay that way: siloed thinking and decision processes frequently lead to separate and incompatible systems, and dysfunctional processes.

A fragmented implementation can negate any financial benefit associated with a customer relationship management system, as companies choose not to use all the associated features factored when justifying the investment.[12] Instead, it is important that support for the CRM system is companywide.[13] The challenge of fragmented implementations may be mitigated with improvements in late-generation CRM systems.[14]

**Business reputation**

Building and maintaining a strong business reputation has become increasingly challenging. The outcome of internal fragmentation that is observed and

commented upon by customers is now visible to the rest of the world in the era of the social customer; in the past, only employees or partners were aware of it. Addressing the fragmentation requires a shift in philosophy and mindset in an organization so that everyone considers the impact to the customer of policy, decisions and actions. Human response at all levels of the organization can affect the customer experience for good or ill. Even one unhappy customer can deliver a body blow to a business.[15]

Some developments and shifts have made companies more conscious of the life-cycle of a customer relationship management system.[16] Companies now consider the possibility of brand loyalty and persistence of its users to purchase updates, upgrades and future editions of software.[17]

Additionally, CRM systems face the challenge of producing viable financial profits, with a 2002 study suggesting that less than half of CRM projects are expected to provide a significant return on investment.[18] Poor usability and low usage rates lead many companies to indicate that it was difficult to justify investment in the software without the potential for more tangible gains.[19]

## Security concerns

A large challenge faced by developers and users is found in striking a balance between ease of use in the CRM interface and suitable and acceptable security measures and features. Corporations investing in CRM software do so expecting a relative ease of use while also requiring that customer and other sensitive data remain secure. This balance can be difficult, as many believe that improvements in security come at the expense of system usability.[20]

Research and study show the importance of designing and developing technology that balances a positive user interface with security features that meet industry and corporate standards.[21] A 2002 study shows, however, that security and usability can coexist harmoniously.[22] In many ways, a secure CRM system can become more usable.

Researchers have argued that, in most cases, security breaches are the result of user-error (such as unintentionally downloading and executing a computer virus). In these events, the computer system acted as it should in identifying a file and then, following the user's orders to execute the file, exposed the computer and network to a harmful virus. Researchers argue that a more usable system creates less confusion and lessens the amount of potentially harmful errors, in turn creating a more secure and stable CRM system.[23]

Technical writers can play a large role in developing customer relationship management systems that are secure and easy to use. A series of 2008 research shows that CRM systems, among others, need to be more open to flexibility of technical writers, allowing these professionals to become content builders.[24] These professionals can then gather information and use it at their preference, developing a system that allows users to easily access desired information and is secure and trusted by its users.

**Types/variations**

**Sales force automation**

Sales force automation (SFA) involves using software to streamline all phases of the sales process, minimizing the time that sales representatives need to spend on each phase. This allows a business to use fewer sales representatives to manage their clients. At the heart of SFA is a contact management system for tracking and recording every stage in the sales process for each prospective client, from initial contact to final disposition. Many SFA applications also include insights into opportunities, territories, sales forecasts and workflow automation, quote generation, and product knowledge. Modules for Web 2.0 e-commerce and pricing are new, emerging interests in SFA.[2]

**Marketing**

CRM systems for marketing help the enterprise identify and target potential clients and generate leads for the sales team. A key marketing capability is tracking and measuring multichannel campaigns, including email, search, social media,

telephone and direct mail. Metrics monitored include clicks, responses, leads, deals, and revenue. Alternatively, Prospect Relationship Management (PRM) solutions offer to track customer behaviour and nurture them from first contact to sale, often cutting out the active sales process altogether.

In a web-focused marketing CRM solution, organizations create and track specific web activities that help develop the client relationship. These activities may include such activities as free downloads, online video content, and online web presentations.[*citation needed*]

## Customer service and support

Recognizing that service is an important factor in attracting and retaining customers, organizations are increasingly turning to technology to help them improve their clients' experience while aiming to increase efficiency and minimize costs.[25] Even so, a 2009 study revealed that only 39% of corporate executives believe their employees have the right tools and authority to solve client problems.[26]

## Appointment

Creating and scheduling appointments with customers is a central activity of most customer oriented businesses. Sales, customer support, and service personnel regularly spend a portion of their time getting in touch with customers and prospects through a variety of means to agree on a time and place for meeting for a sales conversation or to deliver customer service. Appointment CRM is a relatively new CRM platform category in which an automated system is used to offer a suite of suitable appointment times to a customer via e-mail or through a web site. An automated process is used to schedule and confirm the appointment, and place it on the appropriate person's calendar. Appointment CRM systems can be an origination point for a sales lead and are generally integrated with sales and marketing CRM systems to capture and store the interaction.

## Analytics

Relevant analytics capabilities are often interwoven into applications for sales, marketing, and service. These features can be complemented and augmented with links to separate, purpose-built applications for analytics and business intelligence. Sales analytics let companies monitor and understand client actions and preferences, through sales forecasting and data quality.

Marketing applications generally come with predictive analytics to improve segmentation and targeting, and features for measuring the effectiveness of online, offline, and search marketing campaigns. Web analytics have evolved significantly from their starting point of merely tracking mouse clicks on Web sites. By evaluating "buy signals," marketers can see which prospects are most likely to transact and also identify those who are bogged down in a sales process and need assistance. Marketing and finance personnel also use analytics to assess the value of multi-faceted programs as a whole.

These types of analytics are increasing in popularity as companies demand greater visibility into the performance of call centers and other service and support channels,[25] in order to correct problems before they affect satisfaction levels. Support-focused applications typically include dashboards similar to those for sales, plus capabilities to measure and analyze response times, service quality, agent performance, and the frequency of various issues.

**Integrated/Collaborative**

Departments within enterprises — especially large enterprises — tend to function with little collaboration.[27] More recently, the development and adoption of these tools and services have fostered greater fluidity and cooperation among sales, service, and marketing. This finds expression in the concept of collaborative systems that use technology to build bridges between departments. For example, feedback from a technical support center can enlighten marketers about specific services and product features clients are asking for. Reps, in their turn, want to be able to pursue these opportunities without the burden of re-entering records and contact data into a separate SFA system.

**Small business**

For small business, basic client service can be accomplished by a contact manager system: an integrated solution that lets organizations and individuals efficiently track and record interactions, including emails, documents, jobs, faxes, scheduling, and more. These tools usually focus on accounts rather than on individual contacts. They also generally include opportunity insight for tracking sales pipelines plus added functionality for marketing and service. As with larger enterprises, small businesses are finding value in online solutions, especially for mobile and telecommuting workers.

**Social media**

Social media sites like Twitter, LinkedIn and Facebook are amplifying the voice of people in the marketplace and are having profound and far-reaching effects on the ways in which people buy. Customers can now research companies online and then ask for recommendations through social media channels, making their buying decision without contacting the company.

People also use social media to share opinions and experiences on companies, products and services. As social media is not as widely moderated or censored as mainstream media, individuals can say anything they want about a company or brand, positive or negative.

Increasingly, companies are looking to gain access to these conversations and take part in the dialogue. More than a few systems are now integrating to social networking sites. Social media promoters cite a number of business advantages, such as using online communities as a source of high-quality leads and a vehicle for crowd sourcing solutions to client-support problems. Companies can also leverage client stated habits and preferences to "hyper-target" their sales and marketing communications.[28]

Some analysts take the view that business-to-business marketers should proceed cautiously when weaving social media into their business processes. These observers recommend careful market research to determine if and where the

phenomenon can provide measurable benefits for client interactions, sales and support.[29] It is stated that people feel their interactions are peer-to-peer between them and their contacts, and resent company involvement, sometimes responding with negatives about that company.

**Non-profit and membership-based**

Systems for non-profit and membership-based organizations help track constituents and their involvement in the organization. Capabilities typically include tracking the following: fund-raising, demographics, membership levels, membership directories, volunteering and communications with individuals.

Many include tools for identifying potential donors based on previous donations and participation. In light of the growth of social networking tools, there may be some overlap between social/community driven tools and non-profit/membership tools.

**Custom CRM**

Custom CRM software is developed specifically for one client. The advantage of Custom CRM software is that it will have all required functionality, exactly as a client needs it to be. With Custom CRM software, modifications will not be needed. Pre-written software sometimes has missing functionality, causing companies to use multiple software systems.

**Strategy**

For larger-scale enterprises, a complete and detailed plan is required to obtain the funding, resources, and company-wide support that can make the initiative of choosing and implementing a system successfully. Benefits must be defined, risks assessed, and cost quantified in three general areas:

- Processes: Though these systems have many technological components, business processes lie at its core. It can be seen as a more client-centric way of doing business, enabled by technology that consolidates and intelligently distributes pertinent information about clients, sales, marketing effectiveness, responsiveness, and market trends. Therefore, a company must analyze its

business workflows and processes before choosing a technology platform; some will likely need re-engineering to better serve the overall goal of winning and satisfying clients. Moreover, planners need to determine the types of client information that are most relevant, and how best to employ them.[3]

- People: For an initiative to be effective, an organization must convince its staff that the new technology and workflows will benefit employees as well as clients. Senior executives need to be strong and visible advocates who can clearly state and support the case for change. Collaboration, teamwork, and two-way communication should be encouraged across hierarchical boundaries, especially with respect to process improvement.[30]

- Technology: In evaluating technology, key factors include alignment with the company's business process strategy and goals, including the ability to deliver the right data to the right employees and sufficient ease of adoption and use. Platform selection is best undertaken by a carefully chosen group of executives who understand the business processes to be automated as well as the software issues. Depending upon the size of the company and the breadth of data, choosing an application can take anywhere from a few weeks to a year or more.[3]

**Implementation**

**Implementation issues**

Increases in revenue, higher rates of client satisfaction, and significant savings in operating costs are some of the benefits to an enterprise. Proponents emphasize that technology should be implemented only in the context of careful strategic and operational planning.[31] Implementations almost invariably fall short when one or more facets of this prescription are ignored:

- Poor planning: Initiatives can easily fail when efforts are limited to choosing and deploying software, without an accompanying rationale, context, and support for the workforce.[32] In other instances, enterprises simply automate

flawed client-facing processes rather than redesign them according to best practices.

- Poor integration: For many companies, integrations are piecemeal initiatives that address a glaring need: improving a particular client-facing process or two or automating a favored sales or client support channel.[33] Such "point solutions" offer little or no integration or alignment with a company's overall strategy. They offer a less than complete client view and often lead to unsatisfactory user experiences.

- Toward a solution: overcoming siloed thinking. Experts advise organizations to recognize the immense value of integrating their client-facing operations. In this view, internally-focused, department-centric views should be discarded in favor of reorienting processes toward information-sharing across marketing, sales, and service. For example, sales representatives need to know about current issues and relevant marketing promotions before attempting to cross-sell to a specific client. Marketing staff should be able to leverage client information from sales and service to better target campaigns and offers. And support agents require quick and complete access to a client's sales and service history.[33]

**Adoption issues**

Historically, the landscape is littered with instances of low adoption rates. Many of the challenges listed above offer a glimpse into some of the obstacles that corporations implementing a CRM suite face; in many cases time, resources and staffing do not allow for the troubleshooting necessary to tackle an issue and the system is shelved or sidestepped instead.

Why is it so difficult sometimes to get employees up to date on rapidly developing new technology? Essentially, your employees need to understand how the system works, as well as understand the clients and their needs. No doubt this process is time consuming, but it is well worth the time and effort, as you will be better able

to understand and meet the needs of your clients. CRM training needs to cover two types of information: relational knowledge and technological knowledge.

**Supply chain management (SCM)** is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996).[2] Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption (supply chain).

Another definition is provided by the APICS Dictionary when it defines SCM as the "design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally."

**Definitions**

More common and accepted definitions of supply chain management are:

- Supply chain management is the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole (Mentzer *et al.*, 2001).[3]

- A customer focused definition is given by Hines (2004:p76) "Supply chain strategies require a total systems view of the linkages in the chain that work together efficiently to create customer satisfaction at the end point of delivery to the consumer. As a consequence costs must be lowered throughout the chain by driving out unnecessary costs and focusing attention on adding value. Throughout efficiency must be increased, bottlenecks removed and performance measurement must focus on total systems efficiency and equitable reward distribution to those in the supply chain adding value. The supply chain system must be responsive to customer requirements."[4]

- Global supply chain forum - supply chain management is the integration of key business processes across the supply chain for the purpose of creating value for customers and stakeholders (Lambert, 2008).[5]

- According to the Council of Supply Chain Management Professionals (CSCMP), supply chain management encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management. It also includes the crucial components of coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies. More recently, the loosely coupled, self-organizing network of businesses that cooperate to provide product and service offerings has been called the *Extended Enterprise*.

A supply chain, as opposed to supply chain management, is a set of organizations directly linked by one or more of the upstream and downstream flows of products, services, finances, and information from a source to a customer. Managing a supply chain is 'supply chain management' (Mentzer *et al.*, 2001).[3]

Supply chain management software includes tools or modules used to execute supply chain transactions, manage supplier relationships and control associated business processes.

Supply chain event management (abbreviated as SCEM) is a consideration of all possible events and factors that can disrupt a supply chain. With SCEM possible scenarios can be created and solutions devised.

**Problems addressed by supply chain management**

Supply chain management must address the following problems:

- **Distribution Network Configuration**: number, location and network missions of suppliers, production facilities, distribution centers, warehouses, cross-docks and customers.

- **Distribution Strategy**: questions of operating control (centralized, decentralized or shared); delivery scheme, e.g., direct shipment, pool point shipping, cross docking, DSD (direct store delivery), closed loop shipping; mode of transportation, e.g., motor carrier, including truckload, LTL, parcel; railroad; intermodal transport, including TOFC (trailer on flatcar) and COFC (container on flatcar); ocean freight; airfreight; replenishment strategy (e.g., pull, push or hybrid); and transportation control (e.g., owner-operated, private carrier, common carrier, contract carrier, or 3PL).

- **Trade-Offs in Logistical Activities**: The above activities must be well coordinated in order to achieve the lowest total logistics cost. Trade-offs may increase the total cost if only one of the activities is optimized. For example, full truckload (FTL) rates are more economical on a cost per pallet basis than less than truckload (LTL) shipments. If, however, a full truckload of a product is ordered to reduce transportation costs, there will be an increase in inventory holding costs which may increase total logistics costs. It is therefore imperative to take a systems approach when planning logistical activities. These trade-offs are key to developing the most efficient and effective Logistics and SCM strategy.

- **Information**: Integration of processes through the supply chain to share valuable information, including demand signals, forecasts, inventory, transportation, potential collaboration, etc.

- **Inventory Management**: Quantity and location of inventory, including raw materials, work-in-progress (WIP) and finished goods.

- **Cash-Flow**: Arranging the payment terms and methodologies for exchanging funds across entities within the supply chain.

Supply chain execution means managing and coordinating the movement of materials, information and funds across the supply chain. The flow is bi-directional.

**Activities/functions**

Supply chain management is a cross-function approach including managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and the movement of finished goods out of the organization and toward the end-consumer. As organizations strive to focus on core competencies and becoming more flexible, they reduce their ownership of raw materials sources and distribution channels. These functions are increasingly being outsourced to other entities that can perform the activities better or more cost effectively. The effect is to increase the number of organizations involved in satisfying customer demand, while reducing management control of daily logistics operations. Less control and more supply chain partners led to the creation of supply chain management concepts. The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and the velocity of inventory movement.

Several models have been proposed for understanding the activities required to manage material movements across organizational and functional boundaries. SCOR is a supply chain management model promoted by the Supply Chain Council. Another model is the SCM Model proposed by the Global Supply Chain Forum (GSCF). Supply chain activities can be grouped into strategic, tactical, and operational levels. The CSCMP has adopted The American Productivity & Quality Center (APQC) Process Classification Framework[SM] a high-level, industry-neutral enterprise process model that allows organizations to see their business processes from a cross-industry viewpoint.[6]

**[Strategic level**

- Strategic network optimization, including the number, location, and size of warehousing, distribution centers, and facilities.
- Strategic partnerships with suppliers, distributors, and customers, creating communication channels for critical information and operational improvements such as cross docking, direct shipping, and third-party logistics.

- Product life cycle management, so that new and existing products can be optimally integrated into the supply chain and capacity management activities.
- Information technology chain operations.
- Where-to-make and make-buy decisions.
- Aligning overall organizational strategy with supply strategy.
- It is for long term and needs resource commitment.

**Tactical level**

- Sourcing contracts and other purchasing decisions.
- Production decisions, including contracting, scheduling, and planning process definition.
- Inventory decisions, including quantity, location, and quality of inventory.
- Transportation strategy, including frequency, routes, and contracting.
- Benchmarking of all operations against competitors and implementation of best practices throughout the enterprise.
- Milestone payments.
- Focus on customer demand and Habits.

**Operational level**

- Daily production and distribution planning, including all nodes in the supply chain.
- Production scheduling for each manufacturing facility in the supply chain (minute by minute).
- Demand planning and forecasting, coordinating the demand forecast of all customers and sharing the forecast with all suppliers.
- Sourcing planning, including current inventory and forecast demand, in collaboration with all suppliers.
- Inbound operations, including transportation from suppliers and receiving inventory.
- Production operations, including the consumption of materials and flow of finished goods.

- Outbound operations, including all fulfillment activities, warehousing and transportation to customers.

- Order promising, accounting for all constraints in the supply chain, including all suppliers, manufacturing facilities, distribution centers, and other customers.

- From production level to supply level accounting all transit damage cases & arrange to settlement at customer level by maintaining company loss through insurance company.

**Importance of supply chain management**

Organizations increasingly find that they must rely on effective supply chains, or networks, to compete in the global market and networked economy.[7] In Peter Drucker's (1998) new management paradigms, this concept of business relationships extends beyond traditional enterprise boundaries and seeks to organize entire business processes throughout a value chain of multiple companies.

During the past decades, globalization, outsourcing and information technology have enabled many organizations, such as Dell and Hewlett Packard, to successfully operate solid collaborative supply networks in which each specialized business partner focuses on only a few key strategic activities (Scott, 1993). This inter-organizational supply network can be acknowledged as a new form of organization. However, with the complicated interactions among the players, the network structure fits neither "market" nor "hierarchy" categories (Powell, 1990). It is not clear what kind of performance impacts different supply network structures could have on firms, and little is known about the coordination conditions and trade-offs that may exist among the players. From a systems perspective, a complex network structure can be decomposed into individual component firms (Zhang and Dilts, 2004). Traditionally, companies in a supply network concentrate on the inputs and outputs of the processes, with little concern for the internal management working of other individual players. Therefore, the choice of an internal management control structure is known to impact local firm performance (Mintzberg, 1979).

In the 21st century, changes in the business environment have contributed to the development of supply chain networks. First, as an outcome of globalization and the proliferation of multinational companies, joint ventures, strategic alliances and business partnerships, significant success factors were identified, complementing the earlier "Just-In-Time", "Lean Manufacturing" and "Agile Manufacturing" practices.[8] Second, technological changes, particularly the dramatic fall in information communication costs, which are a significant component of transaction costs, have led to changes in coordination among the members of the supply chain network (Coase, 1998).

Many researchers have recognized these kinds of supply network structures as a new organization form, using terms such as "Keiretsu", "Extended Enterprise", "Virtual Corporation", "Global Production Network", and "Next Generation Manufacturing System".[9] In general, such a structure can be defined as "a group of semi-independent organizations, each with their capabilities, which collaborate in ever-changing constellations to serve one or more markets in order to achieve some business goal specific to that collaboration" (Akkermans, 2001).

The security management system for supply chains is described in ISO/IEC 28000 and ISO/IEC 28001 and related standards published jointly by ISO and IEC.

**Supply chain business process integration**

Successful SCM requires a change from managing individual functions to integrating activities into key supply chain processes. An example scenario: the purchasing department places orders as requirements become known. The marketing department, responding to customer demand, communicates with several distributors and retailers as it attempts to determine ways to satisfy this demand. Information shared between supply chain partners can only be fully leveraged through process integration.

Supply chain business process integration involves collaborative work between buyers and suppliers, joint product development, common systems and shared information. According to Lambert and Cooper (2000), operating an integrated

supply chain requires a continuous information flow. However, in many companies, management has reached the conclusion that optimizing the product flows cannot be accomplished without implementing a process approach to the business. The key supply chain processes stated by Lambert (2004)[10] are:

- Customer relationship management
- Customer service management
- Demand management style
- Order fulfillment
- Manufacturing flow management
- Supplier relationship management
- Product development and commercialization
- Returns management

Much has been written about demand management. Best-in-Class companies have similar characteristics, which include the following: a) Internal and external collaboration b) Lead time reduction initiatives c) Tighter feedback from customer and market demand d) Customer level forecasting

One could suggest other key critical supply business processes which combine these processes stated by Lambert such as:

a. Customer service management
b. Procurement
c. Product development and commercialization
d. Manufacturing flow management/support
e. Physical distribution
f. Outsourcing/partnerships
g. Performance measurement
h. Warehousing management

a) Customer service management process

Customer Relationship Management concerns the relationship between the organization and its customers. Customer service is the source of customer

information. It also provides the customer with real-time information on scheduling and product availability through interfaces with the company's production and distribution operations. Successful organizations use the following steps to build customer relationships:

- determine mutually satisfying goals for organization and customers
- establish and maintain customer rapport
- produce positive feelings in the organization and the customers

b) Procurement process

Strategic plans are drawn up with suppliers to support the manufacturing flow management process and the development of new products. In firms where operations extend globally, sourcing should be managed on a global basis. The desired outcome is a win-win relationship where both parties benefit, and a reduction in time required for the design cycle and product development. Also, the purchasing function develops rapid communication systems, such as electronic data interchange (EDI) and Internet linkage to convey possible requirements more rapidly. Activities related to obtaining products and materials from outside suppliers involve resource planning, supply sourcing, negotiation, order placement, inbound transportation, storage, handling and quality assurance, many of which include the responsibility to coordinate with suppliers on matters of scheduling, supply continuity, hedging, and research into new sources or programs.

c) Product development and commercialization

Here, customers and suppliers must be integrated into the product development process in order to reduce time to market. As product life cycles shorten, the appropriate products must be developed and successfully launched with ever shorter time-schedules to remain competitive. According to Lambert and Cooper (2000), managers of the product development and commercialization process must:

1. coordinate with customer relationship management to identify customer-articulated needs;
2. select materials and suppliers in conjunction with procurement, and

3. develop production technology in manufacturing flow to manufacture and integrate into the best supply chain flow for the product/market combination.

d) Manufacturing flow management process

The manufacturing process produces and supplies products to the distribution channels based on past forecasts. Manufacturing processes must be flexible to respond to market changes and must accommodate mass customization. Orders are processes operating on a just-in-time (JIT) basis in minimum lot sizes. Also, changes in the manufacturing flow process lead to shorter cycle times, meaning improved responsiveness and efficiency in meeting customer demand. Activities related to planning, scheduling and supporting manufacturing operations, such as work-in-process storage, handling, transportation, and time phasing of components, inventory at manufacturing sites and maximum flexibility in the coordination of geographic and final assemblies postponement of physical distribution operations.

e) Physical distribution

This concerns movement of a finished product/service to customers. In physical distribution, the customer is the final destination of a marketing channel, and the availability of the product/service is a vital part of each channel participant's marketing effort. It is also through the physical distribution process that the time and space of customer service become an integral part of marketing, thus it links a marketing channel with its customers (e.g., links manufacturers, wholesalers, retailers).

f) Outsourcing/partnerships

This is not just outsourcing the procurement of materials and components, but also outsourcing of services that traditionally have been provided in-house. The logic of this trend is that the company will increasingly focus on those activities in the value chain where it has a distinctive advantage, and outsource everything else. This movement has been particularly evident in logistics where the provision of transport, warehousing and inventory control is increasingly subcontracted to specialists or logistics partners. Also, managing and controlling this network of

partners and suppliers requires a blend of both central and local involvement. Hence, strategic decisions need to be taken centrally, with the monitoring and control of supplier performance and day-to-day liaison with logistics partners being best managed at a local level.

g) Performance measurement

Experts found a strong relationship from the largest arcs of supplier and customer integration to market share and profitability. Taking advantage of supplier capabilities and emphasizing a long-term supply chain perspective in customer relationships can both be correlated with firm performance. As logistics competency becomes a more critical factor in creating and maintaining competitive advantage, logistics measurement becomes increasingly important because the difference between profitable and unprofitable operations becomes more narrow. A.T. Kearney Consultants (1985) noted that firms engaging in comprehensive performance measurement realized improvements in overall productivity. According to experts, internal measures are generally collected and analyzed by the firm including

1. Cost
2. Customer Service
3. Productivity measures
4. Asset measurement, and
5. Quality.

External performance measurement is examined through customer perception measures and "best practice" benchmarking, and includes 1) customer perception measurement, and 2) best practice benchmarking.

h) Warehousing management

As a case of reducing company cost & expenses, warehousing management is carrying the valuable role against operations. In case of perfect storing & office with all convenient facilities in company level, reducing manpower cost,

dispatching authority with on time delivery, loading & unloading facilities with proper area, area for service station, stock management system etc.

Components of supply chain management are as follows: 1. Standardization 2. Postponement 3. Customization

**Theories of supply chain management**

Currently there is a gap in the literature available on supply chain management studies: there is no theoretical support for explaining the existence and the boundaries of supply chain management. A few authors such as Halldorsson, et al. (2003), Ketchen and Hult (2006) and Lavassani, et al. (2009) have tried to provide theoretical foundations for different areas related to supply chain by employing organizational theories. These theories include:

- Resource-Based View (RBV)
- Transaction Cost Analysis (TCA)
- Knowledge-Based View (KBV)
- Strategic Choice Theory (SCT)
- Agency Theory (AT)
- Institutional theory (InT)
- Systems Theory (ST)
- Network Perspective (NP)
- Materials Logistics Management (MLM)
- Just-in-Time (JIT)
- Material Requirements Planning (MRP)
- Theory of Constraints (TOC)
- Total Quality Management (TQM)
- Agile Manufacturing
- Time Based Competition (TBC)
- Quick Response Manufacturing (QRM)
- Customer Relationship Management (CRM)
- Requirements Chain Management (RCM)

- Available-to-promise (ATP)
- and many more

## Supply chain centroids

In the study of supply chain management, the concept of centroids has become an important economic consideration. A centroid is a place that has a high proportion of a country's population and a high proportion of its manufacturing, generally within 500 mi (805 km). In the U.S., two major supply chain centroids have been defined, one near Dayton, Ohio and a second near Riverside, California.

The centroid near Dayton is particularly important because it is closest to the population center of the US and Canada. Dayton is within 500 miles of 60% of the population and manufacturing capacity of the U.S., as well as 60 percent of Canada's population.[11] The region includes the Interstate 70/75 interchange, which is one of the busiest in the nation with 154,000 vehicles passing through in a day. Of those, anywhere between 30 percent and 35 percent are trucks hauling goods. In addition, the I-75 corridor is home to the busiest north-south rail route east of the Mississippi.[11]

**Tax Efficient Supply Chain Management** is a business model which consider the effect of Tax in design and implementation of supply chain management. As the consequence of Globalization, business which is cross-nation should pay different tax rates in different countries. Due to the differences, global players have the opportunity to calculate and optimize supply chain based on tax efficiency[12] legally. It is used as a method of gaining more profit for company which owns global supply chain.

## Supply chain sustainability

Supply chain sustainability is a business issue affecting an organization's supply chain or logistics network and is frequently quantified by comparison with SECH ratings. SECH ratings are defined as *social, ethical, cultural and health* footprints. Consumers have become more aware of the environmental impact of their purchases and companies' SECH ratings and, along with non-governmental

organizations(NGOs), are setting the agenda for transitions to organically-grown foods, anti-sweatshop labor codes and locally-produced goods that support independent and small businesses. Because supply chains frequently account for over 75% of a company's carbon footprint[13] many organizations are exploring how they can reduce this and thus improve their SECH rating.

For example, in July, 2009 the U.S. based Wal-Mart corporation announced its intentions to create a global sustainability index that would rate products according to the environmental and social impact made while the products were manufactured and distributed. The sustainability rating index is intended to create environmental accountability in Wal-Mart's supply chain, and provide the motivation and infrastructure for other retail industry companies to do the same.[14]

More recently, the US Dodd-Frank Wall Street Reform and Consumer Protection Act[15] signed into law by President Obama in July 2010, contained a supply chain sustainability provision in the form of the Conflict Minerals law. This law requires SEC-regulated companies to conduct third party audits of the company supply chains, determine whether any tin, tantalum, tungsten or gold (together referred to as "conflict minerals") is made of up ore mined/sourced from the Democratic Republic of the Congo(DRC), and create a report (available to the general public and SEC) detailing the supply chain due diligence efforts undertaken and the results of the audit.[16] Of course, the chain of suppliers/vendors to these reporting companies will be expected to provide appropriate supporting information.

**Components of supply chain management integration**

**The management components of SCM**

The SCM components are the third element of the four-square circulation framework. The level of integration and management of a business process link is a function of the number and level, ranging from low to high, of components added to the link (Ellram and Cooper, 1990; Houlihan, 1985). Consequently, adding more management components or increasing the level of each component can increase the level of integration of the business process link. The literature on business

process re-engineering,[17] buyer-supplier relationships,[18] and SCM[19] suggests various possible components that must receive managerial attention when managing supply relationships. Lambert and Cooper (2000) identified the following components:

- Planning and control
- Work structure
- Organization structure
- Product flow facility structure
- Information flow facility structure
- Management methods
- Power and leadership structure
- Risk and reward structure
- Culture and attitude

However, a more careful examination of the existing literature[20] leads to a more comprehensive understanding of what should be the key critical supply chain components, the "branches" of the previous identified supply chain business processes, that is, what kind of relationship the components may have that are related to suppliers and customers. Bowersox and Closs states that the emphasis on cooperation represents the synergism leading to the highest level of joint achievement (Bowersox and Closs, 1996). A primary level channel participant is a business that is willing to participate in the inventory ownership responsibility or assume other aspects of financial risk, thus including primary level components (Bowersox and Closs, 1996). A secondary level participant (specialized) is a business that participates in channel relationships by performing essential services for primary participants, including secondary level components, which support primary participants. Third level channel participants and components that support the primary level channel participants and are the fundamental branches of the secondary level components may also be included.

Consequently, Lambert and Cooper's framework of supply chain components does not lead to any conclusion about what are the primary or secondary (specialized) level supply chain components (see Bowersox and Closs, 1996, p. 93). That is, what supply chain components should be viewed as primary or secondary, how should these components be structured in order to have a more comprehensive supply chain structure, and how to examine the supply chain as an integrative one (See above sections 2.1 and 3.1).

**Reverse supply chain** Reverse logistics is the process of managing the return of goods. Reverse logistics is also referred to as "Aftermarket Customer Services". In other words, any time money is taken from a company's warranty reserve or service logistics budget one can speak of a reverse logistics operation.

**Supply chain systems and value**

Supply chain systems configure value for those that organize the networks. Value is the additional revenue over and above the costs of building the network. Co-creating value and sharing the benefits appropriately to encourage effective participation is a key challenge for any supply system. Tony Hines defines value as follows: "Ultimately it is the customer who pays the price for service delivered that confirms value and not the producer who simply adds cost until that point"[4]

**Global supply chain management**

Global supply chains pose challenges regarding both quantity and value:

Supply and value chain trends

- Globalization
- Increased cross border sourcing
- Collaboration for parts of value chain with low-cost providers
- Shared service centers for logistical and administrative functions
- Increasingly global operations, which require increasingly global coordination and planning to achieve global optimums
- Complex problems involve also midsized companies to an increasing degree,

These trends have many benefits for manufacturers because they make possible larger lot sizes, lower taxes, and better environments (culture, infrastructure, special tax zones, sophisticated OEM) for their products. Meanwhile, on top of the problems recognized in supply chain management, there will be many more challenges when the scope of supply chains is global. This is because with a supply chain of a larger scope, the lead time is much longer. Furthermore, there are more issues involved such as multi-currencies, different policies and different laws. The consequent problems include:1. different currencies and valuations in different countries; 2. different tax laws (Tax Efficient Supply Chain Management); 3. different trading protocols; 4. lack of transparency of cost and profit.

**Enterprise resource planning** (**ERP**) integrates internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service, customer relationship management, etc. ERP systems automate this activity with an integrated software application. Its purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders.[1]

ERP systems can run on a variety of hardware and network configurations, typically employing a database as a repository for information.[2]

ERP systems typically include the following characteristics:

- An integrated system that operates in real time (or next to real time), without relying on periodic updates.[*citation needed*]

- A common database, which supports all applications.

- A consistent look and feel throughout each module.

- Installation of the system without elaborate application/data integration by the Information Technology (IT) department.[3]

Finance/Accounting

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General ledger, payables, cash management, fixed assets, receivables, budgeting, consolidation

Human resources

payroll, training, benefits, 401K, recruiting, diversity management

Manufacturing

Engineering, bill of materials, work orders, scheduling, capacity, workflow management, quality control, cost management, manufacturing process, manufacturing projects, manufacturing flow, activity based costing, product lifecycle management

Supply chain management

Order to cash, inventory, order entry, purchasing, product configurator, supply chain planning, supplier scheduling, inspection of goods, claim processing, commissions

Project management

Costing, billing, time and expense, performance units, activity management

Customer relationship management

Sales and marketing, commissions, service, customer contact, call center support

Data services

Various "self–service" interfaces for customers, suppliers and/or employees

Access control

Management of user privileges for various processes

**Origin of "ERP"**

In 1990 Gartner Group first employed the acronym ERP[4] as an extension of material requirements planning (MRP), later manufacturing resource planning[5][6] and computer-integrated manufacturing. Without supplanting these terms, ERP came to represent a larger whole, reflecting the evolution of application integration

beyond manufacturing.[7] Not all ERP packages were developed from a manufacturing core. Vendors variously began with accounting, maintenance and human resources. By the mid–1990s ERP systems addressed all core functions of an enterprise. Beyond corporations, governments and non–profit organizations also began to employ ERP systems.[8]

## Expansion

ERP systems experienced rapid growth in the 1990s because the year 2000 problem and introduction of the Euro disrupted legacy systems. Many companies took this opportunity to replace such systems with ERP. This rapid growth in sales was followed by a slump in 1999 after these issues had been addressed.[9]

ERP systems initially focused on automating *back office functions* that did not directly affect customers and the general public. *Front office functions* such as customer relationship management (CRM) dealt directly with customers, or e–business systems such as e–commerce, e–government, e–telecom, and e–finance, or supplier relationship management (SRM) became integrated later, when the Internet simplified communicating with external parties.[*citation needed*]

"ERP II" was coined in the early 2000s. It describes web–based software that allows both employees and partners (such as suppliers and customers) real–time access to the systems. "Enterprise application suite" is an alternate name for such systems.[*citation needed*]

## Components

- Transactional database
- Management portal/dashboard
- Business intelligence system
- Customizable reporting
- External access via technology such as web services
- Search
- Document management
- Messaging/chat/wiki

- Workflow management

## Best practices

*Best practices* are incorporated into most ERP systems. This means that the software reflects the vendor's interpretation of the most effective way to perform each business process. Systems vary in the convenience with which the customer can modify these practices.[10] Companies that implemented industry best practices reduced time–consuming project tasks such as configuration, documentation, testing and training. In addition, best practices reduced risk by 71% when compared to other software implementations.[11]

The use of best practices eases compliance with requirements such as IFRS, Sarbanes-Oxley, or Basel II. They can also help comply with de facto industry standards, such as electronic funds transfer. This is because the procedure can be readily codified within the ERP software and replicated with confidence across multiple businesses who share that business requirement.[*citation needed*]

## Modularity

Most systems are modular to permit automating some functions but not others. Some common modules, such as finance and accounting, are adopted by nearly all users; others such as human resource management are not. For example, a service company probably has no need for a manufacturing module. Other companies already have a system that they believe to be adequate. Generally speaking, the greater the number of modules selected, the greater the integration benefits, but also the greater the costs, risks and changes involved.[*citation needed*]

## Connectivity to plant floor information

ERP systems connect to real–time data and transaction data in a variety of ways. These systems are typically configured by systems integrators, who bring unique knowledge on process, equipment, and vendor solutions.

**Direct integration**—ERP systems connectivity (communications to plant floor equipment) as part of their product offering. This requires the vendors to offer specific support for the plant floor equipment that their customers operate. ERP

vendors must be expert in their own products, and connectivity to other vendor products, including competitors.

**Database integration**—ERP systems connect to plant floor data sources through staging tables in a database. Plant floor systems deposit the necessary information into the database. The ERP system reads the information in the table. The benefit of staging is that ERP vendors do not need to master the complexities of equipment integration. Connectivity becomes the responsibility of the systems integrator.

**Enterprise appliance transaction modules (EATM)**—These devices communicate directly with plant floor equipment and with the ERP system via methods supported by the ERP system. EATM can employ a staging table, Web Services, or system–specific program interfaces (APIs). The benefit of an EATM is that it offers an off–the–shelf solution.

**Custom–integration solutions**—Many system integrators offer custom solutions. These systems tend to have the highest level of initial integration cost, and can have a higher long term maintenance and reliability costs. Long term costs can be minimized through careful system testing and thorough documentation. Custom–integrated solutions typically run on workstation or server class computers.

**Standard protocols**—Communications drivers are available for plant floor equipment and separate products have the ability to log data to staging tables. Standards exist within the industry to support interoperability between software products, the most widely known being OPC[12]

**Implementation**

ERP's scope usually implies significant changes to staff work processes and practices.[13] Generally, three types of services are available to help implement such changes—consulting, customization, and support.[13] Implementation time depends on business size, number of modules, customization, the scope of process changes, and the readiness of the customer to take ownership for the project. Modular ERP systems can be implemented in stages. The typical project for a large enterprise consumes about 14 months and requires around 150 consultants.[14] Small projects

can require months; multinational and other large implementations can take years.[*citation needed*] Customization can substantially increase implementation times.[14]

**Process preparation**

Implementing ERP typically requires changing existing business processes.[15] Poor understanding of needed process changes prior to starting implementation is a main reason for project failure.[16] It is therefore crucial that organizations thoroughly analyze business processes before implementation. This analysis can identify opportunities for process modernization. It also enables an assessment of the alignment of current processes with those provided by the ERP system. Research indicates that the risk of business process mismatch is decreased by:

- linking current processes to the organization's strategy;
- analyzing the effectiveness of each process;
- understanding existing automated solutions.[17][18]

ERP implementation is considerably more difficult (and politically charged) in decentralized organizations, because they often have different processes, business rules, data semantics, authorization hierarchies and decision centers.[19] This may require migrating some business units before others, delaying implementation to work through the necessary changes for each unit, possibly reducing integration (e.g. linking via Master data management) or customizing the system to meet specific needs.[*citation needed*]

A potential disadvantage is that adopting "standard" processes can lead to a loss of competitive advantage. While this has happened, losses in one area often offset by gains in other areas, increasing overall competitive advantage.[20][21]

**Configuration**

Configuring an ERP system is largely a matter of balancing the way the customer wants the system to work with the way it was designed to work. ERP systems typically build many changeable parameters that modify system operation. For example, an organization can select the type of inventory accounting—FIFO or

LIFO—to employ, whether to recognize revenue by geographical unit, product line, or distribution channel and whether to pay for shipping costs when a customer returns a purchase.[*citation needed*]

## Customization

ERP systems are theoretically based on industry best practices and are intended to be deployed "as is"[22][23]. ERP vendors do offer customers configuration options that allow organizations to incorporate their own business rules but there are often functionality gaps remaining even after the configuration is complete. ERP customers have several options to reconcile functionality gaps, each with their own pros/cons. Technical solutions include rewriting part of the delivered functionality, writing a homegrown bolt-on/add-on module within the ERP system, or interfacing to an external system. All three of these options are varying degrees of system customization, with the first being the most invasive and costly to maintain[24]. Alternatively, there are non-technical options such as changing business practices and/or organizational policies to better match the delivered ERP functionality.

Key differences between customization and configuration include:

- Customization is always optional, whereas the software must always be configured before use (e.g., setting up cost/profit center structures, organisational trees, purchase approval rules, etc.)

- The software was designed to handle various configurations, and behaves predictably in any allowed configuration.

- The effect of configuration changes on system behavior and performance is predictable and is the responsibility of the ERP vendor. The effect of customization is less predictable, is the customer's responsibility and increases testing activities.

- Configuration changes survive upgrades to new software versions. Some customizations (e.g. code that uses pre–defined "hooks" that are called before/after displaying data screens) survive upgrades, though they require retesting. Other customizations (e.g. those involving changes to fundamental data structures) are overwritten during upgrades and must be reimplemented[25].

Customization Advantages:

- Improves user acceptance[26]

- Offers the potential to obtain competitive advantage vis-à-vis companies using only standard features.

Customization Disadvantages:

- Increases time and resources required to both implement and maintain[27].

- Inhibits seamless communication between suppliers and customers who use the same ERP system uncustomized.[*citation needed*]

**Extensions**

ERP systems can be extended with third–party software. ERP vendors typically provide access to data and functionality through published interfaces. Extensions offer features such as:[*citation needed*]

- archiving, reporting and republishing;

- capturing transactional data, e.g. using scanners, tills or RFID

- access to specialized data/capabilities, such as syndicated marketing data and associated trend analytics.

**Data migration**

Data migration is the process of moving/copying and restructuring data from an existing system to the ERP system. Migration is critical to implementation success and requires significant planning. Unfortunately, since migration is one of the final activities before the production phase, it often receives insufficient attention. The following steps can structure migration planning:[28]

- Identify the data to be migrated

- Determine migration timing

- Generate the data templates

- Freeze the toolset

- Decide on migration-related setups

- Define data archiving policies and procedures.

**Comparison to special–purpose applications**

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**Advantages**

The fundamental advantage of ERP is that integrating the myriad processes by which businesses operate saves time and expense. Decisions can be made more quickly and with fewer errors. Data becomes visible across the organization. Tasks that benefit from this integration include[29]:

- Sales forecasting, which allows inventory optimization

- Order tracking, from acceptance through fulfillment

- Revenue tracking, from invoice through cash receipt

- Matching purchase orders (what was ordered), inventory receipts (what arrived), and costing (what the vendor invoiced)

ERP systems centralize business data, bringing the following benefits:

- They eliminate the need to synchronize changes between multiple systems—consolidation of finance, marketing and sales, human resource, and manufacturing applications

- They enable standard product naming/coding.

- They provide a comprehensive enterprise view (no "islands of information"). They make real–time information available to management anywhere, any time to make proper decisions.

- They protect sensitive data by consolidating multiple security systems into a single structure.[30]

**Disadvantages**

- Customization is problematic.

- Re–engineering business processes to fit the ERP system may damage competitiveness and/or divert focus from other critical activities

- ERP can cost more than less integrated and/or less comprehensive solutions.

- High switching costs increase vendor negotiating power vis a vis support, maintenance and upgrade expenses.

- Overcoming resistance to sharing sensitive information between departments can divert management attention.

- Integration of truly independent businesses can create unnecessary dependencies.

- Extensive training requirements take resources from daily operations.

The limitations of ERP have been recognized sparking new trends in ERP application development, the four significant developments being made in ERP are, creating a more flexible ERP, Web-Enable ERP, Interenterprise ERP and e-Business Suites, each of which will potential address the fallbacks of the current ERP.

## 1.7 SUMMARY

- E-commerce represents online transactions.

- It is the retail version of the Electronic Data Interchange (EDI).

- In general terms, e-commerce is a business methodology that addresses the needs of organizations, traders and consumers to reduce costs while improving the quality of goods and services and increasing the speed of service delivery.

- In terms of types, it has four types: Business-to-Business (B2B), Business-to-Consumer (B2C), Consumer-to-Business (C2B) and Consumer-to-Consumer (C2C).

- These models are dynamic business models and are changing as per the needs of the e-consumers.

- Online payment is fast emerging as a good alternative to physical mode of payments.

- Electronic fund transfer mechanisms are a reality now.

- Financial institutions and banks have transformed themselves into huge financial networks providing real time facilities to their customers.

- The traditional 'brick-and-mortar' banking model has given way to 'click-and-mortar' banking model which has made many online payment options available to a consumer.

- Significantly, the law also grants legal validity to such online payment instruments.

## 1.8 TERMINAL QUESTIONS

1. Traditional business models have found extension in the electronic medium. Discuss this statement in light of various e-commerce models giving examples.

2. E-commerce business models are adapting themselves to the changing consumer behaviour in an online environment. Is it a correct statement to make? Explain.

3. It is said that technology has made online world a safer, convenient and cost effective medium to do monetary transactions. Do you agree with this statement? Give reasons.

4. What is the role of public key infrastructure in creating trust in an online medium?

5. Explain the working of online payment mechanism?E-commerce

## 1.9 ANSWERS

Self Assessment Questions

1. EDI.

2. E-commerce can be conducted over telephone, fax machines, automatic teller machine (ATMs), electronic payment system such as prepaid telephone cards, electronics data interchange (EDI), televisions and the internet.

3. (1) Business to Business (B2B), (2) Business to Consumer (B2C), (3) Consumer to Business (C2B), and (4) Consumer to consumer (C2C).

1. Electronic Clearing Services (ECS) 'credit scheme' and Electronic Clearing Services (ECS) 'debit scheme'.

2. It is a mechanism to ensure authenticity, message integrity, non-repudiation and confidentiality of an electronic record.

3. The allocation of risk.

4. Asymmetric crypto system.

**Terminal Questions**

1. Refer the unit and analyze the problem in your own way.

2. Refer to sub-section 2.4.2 of the unit.

3. Refer to section 2.4 of the unit.

4. Refer to section 1.3 of the unit.

5. Refer to sections 1.3, 1.4 of the unit.

**1.10 REFERENCES AND SUGGESTED READINGS**

1. Teitelman Robert and Stephen Davis. "How the Cash Flows?". Institutional Investor 58. Aug.1996.

2. Electronic Messaging Services Task Force. The Commercial Use of Electronic Data Interchange: "A Report and Model Trading Partner Agreement". 45 Bus. Law 1645. 1990.

3. US Small Business Administration. Office of Advocacy. E-commerce: Small Business Venture Online. at 3 July. 1999.

4. US Department of Commerce. US Census Bureau. E-Stat. at (Mar. 18. 2002).

5. www.gartner.com

6. www.wto.org

7. www.paypal.com

8. Sharma, Vakul. "E-commerce: A New Business Paradigm". in Legal Dimensions of Cyberspace Ed. Verma, S.K. and Mittal Raman. ILI Publications. 2004.

9. SWIFT is a reliable. Secure. high-speed. global telecommunications network owned by its bank participants and used to transmit financial instructions in machine-readable formats worldwide.

10. CHIPS are a computerised funds transfer system operated by the New York Clearing House Association. It is used primarily for high-value, cross-border payments.

3. www.rbi.org.in

4. According to Power Shopper Report - IOAI Ecommerce Report 2005. 62% of online shoppers have used 'credit cards' for online purchase.

5. See: www.cybercash.com

6. See: www.ecoin.net

7. Rowley Jennifer. "E-business – Principles & Practice". p.249. Palgrave. 2002.

8. Ibid. p.252

9. Sharma Vakul. 2004 "E-commerce: A New Business Paradigm". in Legal

Dimensions of Cyberspace. Ed. Verma. S.K. and Mittal Raman. ILI Publications.