



The appearance of e-commerce is shifting in a present scenario towards the necessity and requisite. Educational Institutions like Indira Gandhi National Open University which is pioneer in self paced learning and technology enabled learning. The distinguish corporate houses are trying to educate and train learners, students and employees in e-commerce applications and technology, so that it becomes part and parcel in their day-to-day learning and usages. Since e-commerce is in a nascent stage and varying so rapidly, organizations face numerous challenges, and there are prospects in developing curricula for e-commerce in a big way.

The world is experiencing speedy changes in the knowledge landscape. With various dramatic scientific and technological advances, such as the rise of big data, machine learning, and artificial intelligence, many unskilled jobs worldwide may be taken over by machine and robots and in present scenario collaborative effort of Robots and Human known as Cobots. Keeping in mind framework of National Education Policy (NEP), School of Management Studies had initiated a Skill Enhancement course to look closely into the development of curricula and teaching methods for E-commerce processes, practices, and technologies with an intention to imbibe skills among its students and youth, with a greater emphasis on the development of employment opportunities and research activities.

BCOS-184 is one of the Skill Enhancement (4 credits) elective courses that falls under 4th Semester of B.Com (G) programme offered under CBCS scheme. The main objective of this course is to familiarize the learners with the knowledge and understanding of E-commerce. This course by and large makes learners acquainted with the contemporary ways of doing business and emphasizes more on internet based business and their set-up. The entire 15 units have been bifurcated into 5 blocks.

This Self Learning Material (SLM) has the noteworthy features which further bifurcated into different blocks

BLOCK 1	BASICS OF E-COMMERCE	5
UNIT 1	Introduction to E-commerce	7
UNIT 2	E-Commerce Business Models	25
UNIT 3	Technology used in E-Commerce	39
UNIT 4	Electronic Governance	62
BLOCK 2	E-PAYMENT SYSTEMS	83
UNIT 5	E-Payments	85
UNIT 6	E Banking	111
BLOCK 3	WEBSITE DEVELOPMENT AND HOSTING	129
UNIT 7	Website Development	131
UNIT 8	Electronic Commerce Software	153
UNIT 9	Web Server Hardware and Software	170
BLOCK 4	CYBER SECURITY AND IT ACT	189
UNIT 10	Cyber Security	191
UNIT 11	Cyber Security Measures	218
UNIT 12	IT Act 2000	246
BLOCK 5	ONLINE PORTAL AND APPLICATION	267
UNIT 13	E-Tailing	269
UNIT 14	E-Services	286
UNIT 15	App Based Commerce	315

PROGRAMME DESIGN COMMITTEE B.COM (CBCS)

Prof. Madhu Tyagi Director, SOMS, IGNOU	Prof. K. V. Bhanumurthy (Retd.) Department of Commerce University of Delhi	Faculty Members SOMS, IGNOU Prof. N. V. Narasimham Prof. Nawal Kishor Prof. M.S.S. Raju Prof. Sunil Kumar Gupta Dr. Subodh Kesharwani Dr. Rashmi Bansal Dr. Madhulika P. Sarkar Dr. Anupriya Pandey
Prof. R.P. Hooda Former Vice-Chancellor MD University, Rohtak	Prof. Kavita Sharma Department of Commerce University of Delhi	
Prof. B. R. Ananthan Former Vice Chancellor Rani Chennamma University Belgaon, Karnataka	Prof. Khurshid Ahmad Batt Dean, Faculty of Commerce & Management University of Kashmir, Srinagar	
Prof. I. V. Trivedi Former Vice Chancellor M. L. Sukhadia University Udaipur	Prof. Debarata Mitra Department of Commerce University of North Bengal Darjeeling	
Prof. Purushotham Rao (Retd) Department of Commerce Osmania University, Hyderabad	Prof. R. K. Grover (Retd.) SOMS, IGNOU	
Prof. D.P.S. Verma (Retd.) Department of Commerce University of Delhi		

COURSE PREPARATION TEAM

Dr. Charru Malhotra Indian Institute of Public Administration New Delhi (Unit 1, 2, 3 & 4)	Prof. Neeraj Kumar Singh Institute of Business Management, CSJM University, Kanpur (Unit 9)	Dr. Vinita Sharma Department of IT, New Delhi Institute of Management (Unit 11 and 15)
Dr. Subodh Kesharwani SOMS, IGNOU (Unit 5)	Dr. Sudhansh Sharma SOCIS, IGNOU (Unit 10)	Joint Editors
Prof. Raj Agrawal AIMA, New Delhi (Unit 6)	Dr. Deep Shree DSM, Delhi Technological University (Unit 12)	Prof. Namrata Agarwal Arun Jaitley National Institute of Financial Management, Ministry of Finance, Government of India, Faridabad
Ms. Jyoti Research Scholar SOMS, IGNOU, (Unit 7)	Dr. Nitika Sharma Christ University, Gaziabad (Unit 13)	& Dr. Subodh Kesharwani School of Management Studies, Indira Gandhi National Open University, New Delhi
Ms. Shailza Research Scholar SOMS, IGNOU (Unit 7)	Dr. Ritesh Saxena CME, All India Management Association New Delhi (Unit 14)	
Dr. D.K. Dhusia Department of Commerce & Business Studies, Jamia Millia Islamia, New Delhi (Unit 8)		Course Coordinator Dr. Subodh Kesharwani

MATERIAL PRODUCTION

Mr. Y.N. Sharma Assistant Registrar (Publication) MPDD, IGNOU, New Delhi	Mr. Sudhir Kumar Section Officer (Pub.) MPDD, IGNOU, New Delhi	Mr. Parvesh Kumar J.A.T., SOMS, IGNOU New Delhi
--	--	---

March, 2021

© Indira Gandhi National Open University, 2021

ISBN:

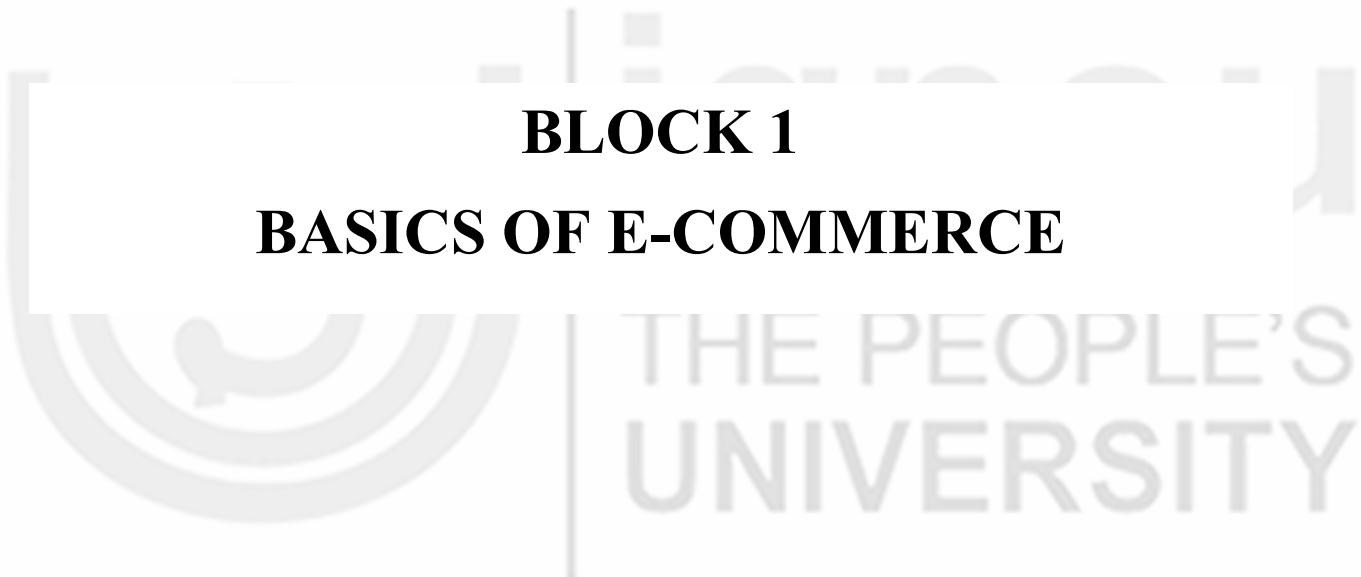
All rights reserved. No part of this work may be reproduced in any form, by mimeograph or any other means, without permission in writing from the Indira Gandhi National Open University.

Further information on the Indira Gandhi National Open University courses may be obtained from the University's office at Maidan Garhi, New Delhi-110 068.

Printed and published on behalf of the Indira Gandhi National Open University, New Delhi, by the Registrar, MPDD, IGNOU.

Laser typeset by Tessa Media & Computers, C-206, A.F.E-II, Jamia Nagar, New Delhi





BLOCK 1

BASICS OF E-COMMERCE

BLOCK 1 BASICS OF E-COMMERCE

This is the first block of the course “E-Commerce”. This block will familiarise you about the basic introduction to E-commerce, various models used in E-commerce, technology used in E-commerce and E-governance. This block is structured to cover the fundamentals and preliminary aspects of E-commerce. The block on the theme “Basics of E-Commerce” comprises of four units, the detail of which is mentioned below:

- **Unit-1:** This unit gives the basic introduction of E-commerce and its evolution, types, importance on one hand as well as advantages and disadvantages on the other hand. The unit also makes us familiar, how the concept of E-commerce has evolved over time and thus helping us in enormous ways.
- **Unit-2:** This unit discusses the various models of E-commerce along with their key elements and major categorization. Apart from that the unit also explains the role of emerging technologies such as Mobility, cloud, AI and IoT of E-commerce.
- **Unit-3:** This unit makes the learners familiar with the various building blocks and technology used in E-commerce. The unit briefs about the various technologies emerging these days. The later part of the unit focuses on the various website designing models as well as the distinctions between app based and a web-based business.
- **Unit-4:** This unit familiarizes the learners with the electronic governance framework in India by emphasising on its meaning, planning, evolution, growth and importance. The unit throws light on the various popular e-governance schemes such as E-Granthalaya, Mygov.in, Digital India, Passport Seva Project etc.

UNIT 1 INTRODUCTION TO E-COMMERCE

Structure

- 1.0 Objectives
- 1.1 Introduction
- 1.2 Meaning of E-Commerce
 - 1.2.1 E-Commerce Web Portal
 - 1.2.2 E-Commerce Software
 - 1.2.3 E-Commerce APIs
 - 1.2.4 M-Commerce and Multi-channel Commerce
 - 1.2.5 Use of Emerging Technologies in E-Commerce
- 1.3 Why E-Commerce
- 1.4 Evolution of E-Commerce
- 1.5 Types of E-Commerce
 - 1.5.1 B2B: Business-to-Business Model of E-Commerce
 - 1.5.2 B2C: Business-to-Consumer Model of E-Commerce
 - 1.5.3 C2C: Consumer-to-Consumer Model of E-Commerce
 - 1.5.4 C2B: Consumer-to-Business Model of E-Commerce
 - 1.5.5 B2G: Business-to-Government Model of E-Commerce
 - 1.5.6 C2A: Consumer-to-Administration Model of E-Commerce
 - 1.5.7 P2P: Peer-to-Peer Model of E-Commerce
 - 1.5.8 D2C: Direct to Consumer Model of E-Commerce
- 1.6 Advantages and Disadvantages of E-Commerce
 - 1.6.1 Advantages of E-Commerce
 - 1.6.2 Disadvantages of E-Commerce
- 1.7 Let Us Sum Up
- 1.8 Key Words
- 1.9 Answers to Check Your Progress
- 1.10 Terminal Questions

1.0 OBJECTIVES

After studying this unit, you should be able to:

- understand the concept of e-commerce;
- describe the evolution of e-commerce;
- classify e-commerce; and
- list the various advantages and disadvantages of e-commerce.

1.1 INTRODUCTION

Internet has revolutionised all aspects of our existence. If one has access to an internet enabled digital device such as a desktop, laptop, tablet or a smartphone, then world seems to be such a small place. This easy access to various kinds of information, services, and product, which is now just a click away, has particularly influenced the way the businesses are transacted using Internet.

Businesses, also called ‘commerce’, is fundamentally a cost-effective movement involving buying and selling of goods between a buyer and a seller. For example, in a traditional format, a buyer would enter a shop, examine the product, select a particular product and pay for it. To complete this business transaction, the seller too, at his/her end would carry out several business transactions like issuing an invoice, delivering the product and so on. The seller would also undertake several other business functions including management of inventory, financial records, logistics, and so on. Now, with advent and proliferation of Internet, all such business functions, undertaken both by the buyer and the seller, could be smoothly undertaken electronically using Internet by creating a website or a web portal. Buyers and the sellers come together on this specially designed website or web-portal and their transactions cross physical boundaries of the firm.

1.2 MEANING OF E-COMMERCE

As is obvious, the term e-commerce is an abbreviated term for ‘electronic commerce’, which refers to the process of undertaking business transactions over internet. Almost anything - ranging from basic items such as breads or soaps, to high end expensive products such as computers or cars and even highly specialised services such as sale of second-hand products to purchase of property, are all available on the related e-commerce web-portals.

Depending on the products and services available, e-commerce web-portals could be understood to be ‘Generic’ and ‘Specific’. Examples of generic e-commerce portals are ‘FlipCart’, ‘Amazon’, where one could buy any product, ranging from furniture to flowers. On the other hand ‘Big Basket’ could be termed as a specific e-commerce web portal as the customer can order for only grocery related products on this web portal.

As we have understood earlier, e-commerce enables buyers to undertake all steps of a purchase decision with the support of various features provided by an e-commerce software. Majority of the business steps are undertaken electronically and not physically. No (or negligible) paperwork is required, nor is any physical contact necessary. Such revolutionary characteristics of e-commerce have made it extremely popular, particularly in present pandemic times.

1.2.1 E-Commerce Web Portal

A web portal, also referred only as a ‘portal’, is an integrated collection of webpages on a particular theme and serves as a single-stop window for that theme. Unlike a website, a portal provides not just the desired information at a single point but also provides other facilities such as an internal search-engine, personalised logins and emails to its regular visitors, online forums and much more. All these features are accessible to the visitor in a user-friendly manner. In several ways, a web-portal could be considered as a collection of several interrelated websites to provide users a more cohesive experience on that theme, for which it is designated.

A web-portal that is specially designed to host the products and services details is called an ‘e-commerce web-portal’. It is only through a well-designed web-portal that sellers can provide its buyers with a wide set of option of products, price-choices, and related services that they offer, using it as an online shopping arena. Therefore, an e-commerce web portal provides a range of online activities related to selling of services as well as products. All these activities are undertaken and managed using specially designed ‘e-commerce software’ that serves as its ‘driving force’.

1.2.2 E-Commerce Software

An e-commerce software typically ensures that the entire commercial cycle of buying and selling over the Internet is conducted smoothly, both for the buyer as well as the seller. For instance, a typical e-commerce software provides several features including a dedicated engine for searching various products, vendors and/or price preferences for a buyer. It further helps a buyer to select and choose the items to purchase. It enables secure monetary transactions to complete the purchase. While helping a buyer to undertake these steps, an e-commerce software also helps the buyer to collate multiple orders in a dedicated basket, additions/deletions/modifications are permitted to be undertaken anytime on this basket. This software even manages address details and order history for each of its buyers, provides multi-channel product booking/delivery and much more.

By and large, it is the role of the e-commerce software to not just help to conduct the entire business smoothly but also to provide various facilities and utilities to both the buyer and the seller that would evoke trust in them to continue their transactions on these portals.

1.2.3 E-Commerce APIs

All e-commerce related technologies and features are connected to each other using Application Programming Interfaces (APIs). APIs are ready-to-use, computing interfaces/software intermediaries that help to exchange information from one feature to another, from one software to another, from one platform to another. For example, using a pre-designed e-commerce API, an e-commerce seller can smoothly integrate the portal with a shipping portal and easily ‘import’ data of the shipments and orders lying on that shipping

portal (called Shipping APIs) and so on. Similarly, there are scores of e-commerce APIs available for getting product details (Product Information APIs), for tracking the inventory management (Inventory APIs), for creating buyer baskets (Order APIs). Similarly, there are Authentication APIs, Catalog APIs, Marketing APIs, Payment APIs and so on. All data exchanges are, therefore, smoothly undertaken by ready-to-use APIs without the explicit need of programming.

1.2.4 M-Commerce and Multi-channel Commerce

All software features, that are available on an e-commerce web-portal are popularly accessible through mobile-friendly application interfaces , called *apps* (a common abbreviation for Applications). Apart from a web-portal or a mobile phone, several other channels, such as social-media accounts and even physical outlets, too are configured to provide ease-of-access to the buyers. Buyers can select or specify their choices of all the channels that are already provided on the online shopping account. Multichannel commerce extensively employs e-mails and social media as their digital marketing channels. Similarly, sales could be carried out by a seller using either a web-portal alone or coupled with a physical, brick-and-mortar store outlets too. The whole purpose of multichannel commerce is to interact in multiple ways with the buyers, which has led to several kinds of e-commerce models (to be covered in the subsequent section).

1.2.5 Use of Emerging Technologies in e-Commerce

These online accounts are not just routinely programmed but are mostly personalised and contextualised for each individual, using advance programming features provided by Artificial Intelligence (AI) / Machine Learning (ML) techniques. Further with gradual advent, e-commerce web portals now also employ other emerging technologies like Augmented reality (AR), Virtual reality (VR), Block chain and many more. The purpose of employing emerging technologies in an e-commerce web portal is to provide its customers with an enhanced user experience (UX) and comfortable user interface (UI).

Overall, such kind of Internet based business ecosystem that comprises of an e-commerce web-portal, e-commerce software, e-commerce ‘app’ and e-commerce APIs permit various buyers and sellers to undertake a business transaction comfortably and securely, is referred as ‘e-commerce’.

1.3 WHY E-COMMERCE

At present, if we look around us, the books we read, the dresses we wear, the grocery we consume , the new furniture additions we have at our homes / offices, have been primarily bought from e-commerce web portals .

Undoubtedly, e-commerce is emerging as a key field for business expansion as it is economical, accessible, and easy to use. It provides choices and

improved service delivery options to the buyers. Buyers do not have to invest in travelling to various shops to compare and buy the ‘best’ product. Similarly, a seller does not have to establish a ‘brick and mortar’- physical infrastructure for selling any product/ service and can also access more buyers at a much lesser cost. In fact, both buyers and sellers can transact on e-commerce portal, inconsequential of their location or size of the transaction (Fig 1.1).



Fig 1.1 : E-Commerce

More particularly, e-commerce portals provide buyers an added advantage of comparing varied prices and features of products available on any e-marketplace. Competition has tremendously increased, and business models used by companies in conducting their businesses have been completely redefined. This has led to reengineering and digital transformation of all the related business processes such as inventory management, marketing, and customer management and so on. It offers opportunities on a universal basis to give a push to and expand business processes, while developing new models and markets for business organizations across the board.

It is a comparatively new and emerging concept, and hence can transform conventional forms of economic activities, not just at an organisation level but also at the national level. Its impact is already visible in large scale sectors such as finance, retail trade and even in public service delivery including education, health, transportation etc. Indeed e-commerce has made business more competitive, more-fun and surely more easy and diverse.

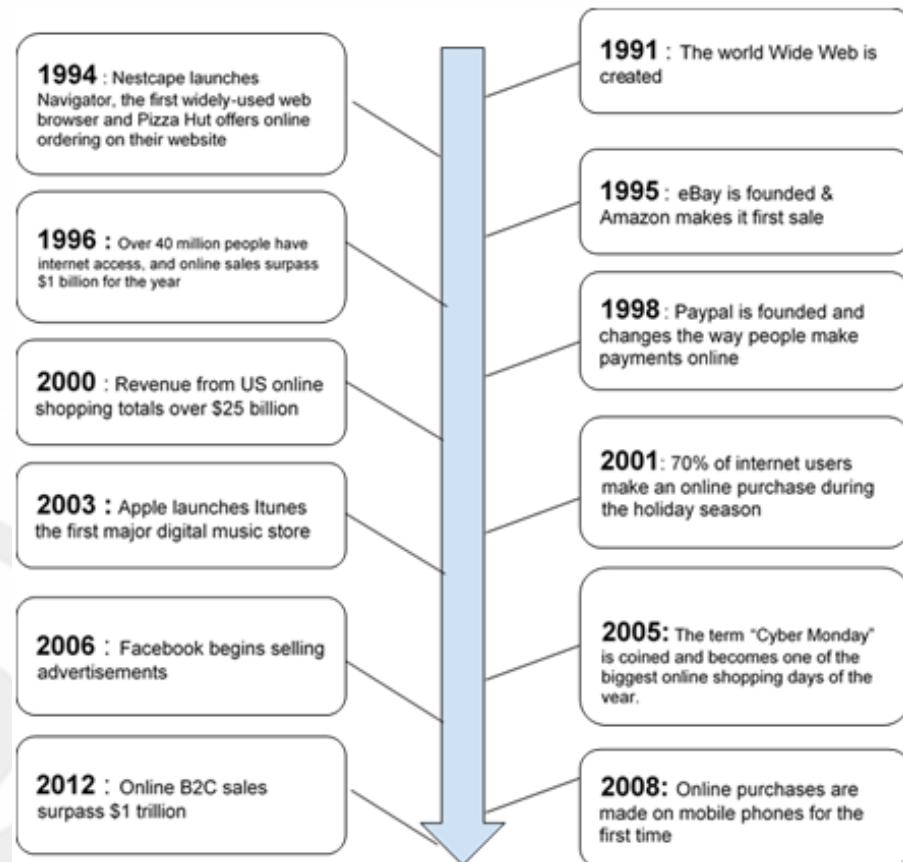
1.4 EVOLUTION OF E-COMMERCE

It was in the year 1991 that the ease of use of Internet was established by the design of World Wide Web. In the year 1994, Pizza Hut was the first company to offer its Pizza online on its own site (Fig 1.2) and almost after a gap of a year eBay is was found. Initially it was considered only as the process of online submission of supporting documents when a transaction was undertaken.

From the year 1995 onwards, rise of e-commerce, earlier known as “web-commerce” became more prominent. This primarily happened due to the global use and adoption of Internet. This was the time when several retail

websites had been planned and launched for sale/purchase of goods and services over internet.

However, this was not only to bounce back in next five years consistent success. In the late 1990s (1999), the dot.com bubble burst thereafter. More particularly, by the year 2005, the increase in online purchases on certain days became so much that the term “Cyber Mondays” was coined (Fig1.2) . Based on review of literature, the initial milestones in e-commerce evolution are detailed herewith (Fig1.2)



Source : Ferrera, Cécile; Kessedjian, Eowyne (2019) : Evolution of E-commerce and Global Marketing, International Journal of Technology for Business (IJTB), ISSN 2644-5085, Springwish Publisher, Bratislava, Vol. 1, Iss. 1, pp. 33-38, <http://dx.doi.org/10.5281/zenodo.2591544>

Fig 1.2 : Evolution of e-Commerce (1994-2012)

The growth of social media over the past few years too has ensured that the relationship between the sellers and the buyers is more engaging and more extensive.

The Present : At present, in the year 2021, Internet and digital devices such as smart phones and tablets have expanded the application of e-commerce to include global buyers and sellers. Most businesses, now have an online presence intensifying the price competition. Newer channels of distribution have been created leading to development of alternative business models for conducting transactions. The structure and nature of business firms have also changed. Promotions and online advertising have also become direct and targeted at the buyer.

As a result of all these changes, there is marked transformation in the prevalent trade practices, trade techniques, and standards having direct impact on the marketplace.

Indeed, e-commerce brings out the possibility of better organized conduct of businesses, which offers not only the replacement of existing business strategies, but also the viability of complimentary business models to the existing ones. We shall study that in the subsequent section.

1.5 TYPES OF E-COMMERCE

Many different models of electronic transactions exist in the world of e-commerce today. Generally, these are classified as- B2B (Business-to-Business), B2C (Business-to-Consumer), C2C (Consumer-to-Consumer), C2B (Consumer-to-Business), B2G (Business-to-Government/Administration), C2A (Consumer-to-Administration) and P2P (Peer-to-Peer), Direct to consumer (D2C) (Fig 1.3).

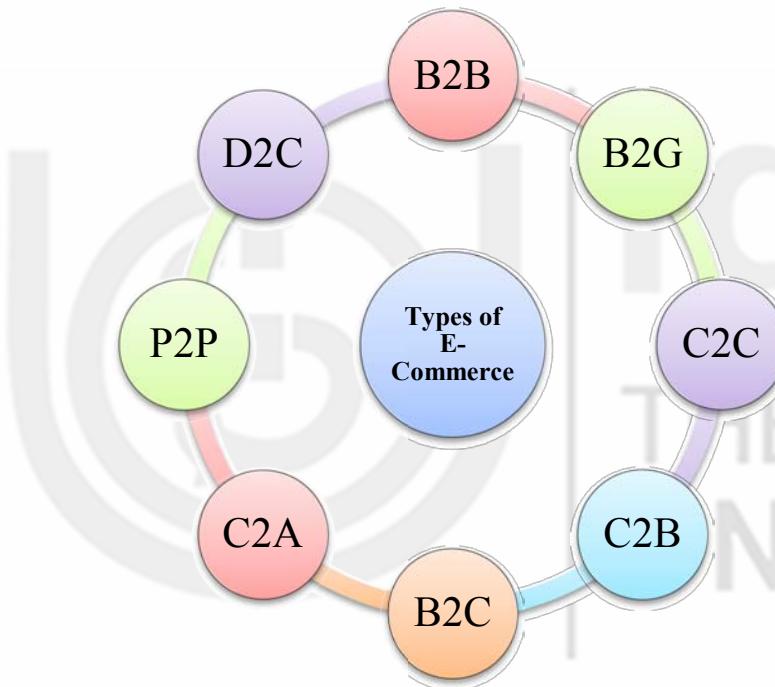


Fig 1.3: Different types of e-Commerce

This classification is based on the nature of their transactions and are elaborated upon below:

1.5.1 B2B: Business-to-Business Model of E-Commerce

In business-to-business (B2B) type of e-commerce system, companies that are involved in the supply chain, such as a manufacturer selling a product to a wholesaler, the wholesaler selling the product to a retailer, all come together to conduct business with each other using a common portal. In such an instance, the manufacturer could have a website / web portal that could also be used by the wholesaler to place orders for the product; this order could then be processed and sent to the wholesaler. The wholesaler could further

use the same portal to advertise the product or take orders from a retailer for the same. This kind of business is called B2B type of e-commerce (Fig 1.4).

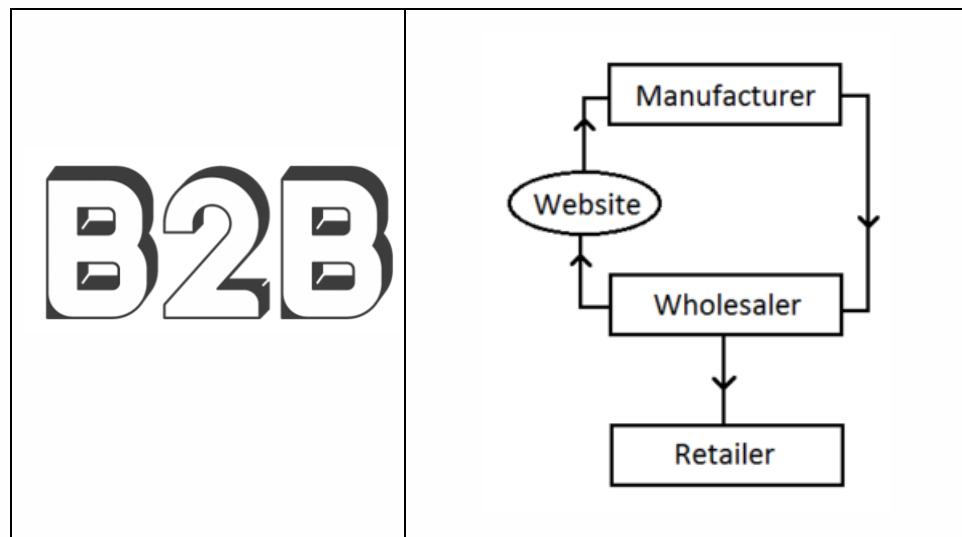


Fig 1.4: B2B model

1.5.2 B2C: Business-to-Consumer Model of E-Commerce

This model of e-commerce is understood to be the process where a company or business sells their goods, services and products directly to the buyer using Internet. The buyer has the liberty of browsing through the Internet to filter, check and view products and then order them. After receiving an order, the company proceeds to process and send the order directly to the buyer.



Fig 1.5: B2C Model

The above figure (Fig 1.5) shows the process followed in this model, the buyer can surf the web portals or mobile applications of the seller companies and directly order the products. After receiving the order, the seller company processes the same before sending it to the buyer. Hence, in this 'B2C' model of e-commerce, the company tries to sell a product directly to the buyer.

Popular examples of B2C are 'Amazon', and 'Flipkart'. It is important to note that majority of the e-commerce companies do not manufacture products or produce these services, but rather list them on their website/ web portal for payments.

1.5.3 C2C: Consumer-to-Consumer Model of E-Commerce

This form of e-commerce is understood to be a model where consumers sell goods, services and products to another consumer using web technologies and the internet. This model comprises the selling of a wide range of products including movable assets and properties.

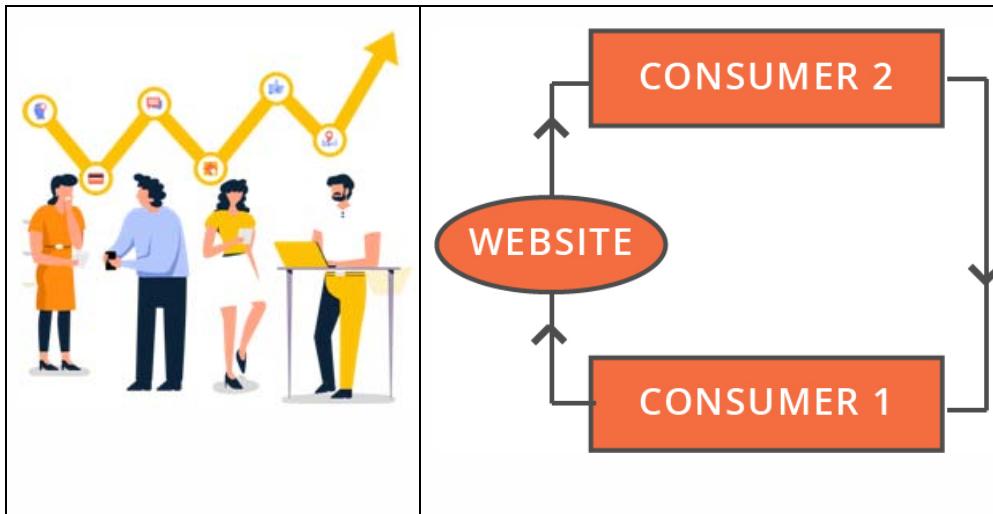


Fig 1.6: C2C Business Model

Companies such as ‘Quicker’, ‘OLX’ and so on are some examples of this model of C2C e-commerce.

1.5.4 C2B: Consumer-to-Business Model of E-Commerce

Unlike ‘B2C’ model, it is a type of commerce where consumers themselves provide goods, services and products to an organization (or business) as illustrated below.

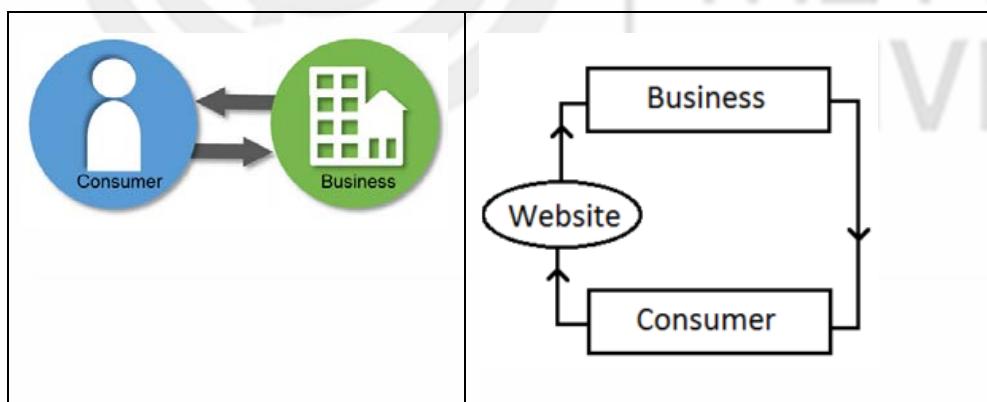


Fig 1.7: C2B Business Model

There is another version of this model; in this version, the consumer create and utilize their own social media profiles (blogs etc) to link back to the product sold on the company's ecommerce website / web portal, thereby consumers facilitates the sale of company's products and are usually rewarded by these companies for doing so.

1.5.5 B2G: Business-to-Government Model of E-Commerce

Business-to-government, also known as business-to-administration, refers to trade between the business sector as a supplier and a government body as a customer. This kind of e-commerce refers to the situation where businesses conduct commerce with the government; it is essentially a part of the ‘B2B’ model.

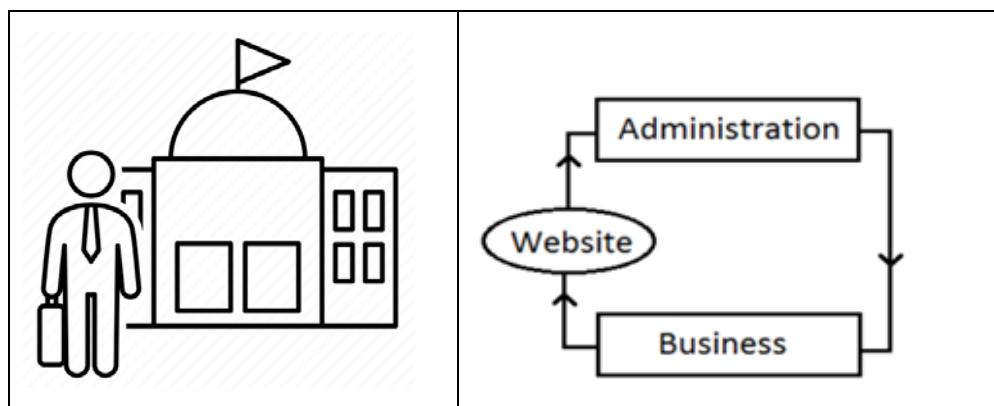


Fig 1.8: B2G Business Model

B2G business, as illustrated above (Fig1.8) , is generally also referred to as public sector marketing, which indicates the marketing of products and services to various government agencies and various levels. The business network provides a platform to businesses to bid on government opportunities such as auctions, tenders and application submission and so on for various services etc. These activities are increasingly being conducted through the internet using real time bidding. “ Government e-MarketPlace - GEM” portal by Government of India, is an example of the same.

1.5.6 C2A: Consumer-to-Administration Model of E-Commerce

The model refers to the e-commerce process followed by the consumers when interacting directly with the government agencies. This may be in the form of payments, information access requests or feedback to various agencies among other things. Consumer to government/administration model for e-commerce is the ideal answer for establishing communication between the consumers and the government.

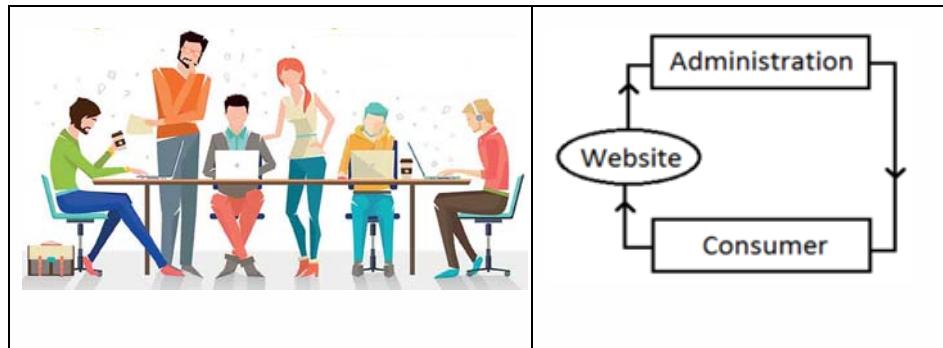


Fig 1.9: C2A Business Model

Examples of ‘C2A’ models include e-government applications such as payment of utility bills including electricity and water, tax payments, health insurance payments made using web and mobile applications. A simplified representation of the model is illustrated (Fig1.9).

1.5.7 P2P: Peer-to-Peer Model of E-Commerce

P2P model is essentially a networked model of commerce without any intermediary. It is therefore a distributed platform enabling different individuals to partake in transactions with each other without an in-between third party. This model of network arrangement is different from the client server model where communication takes place from the central server.

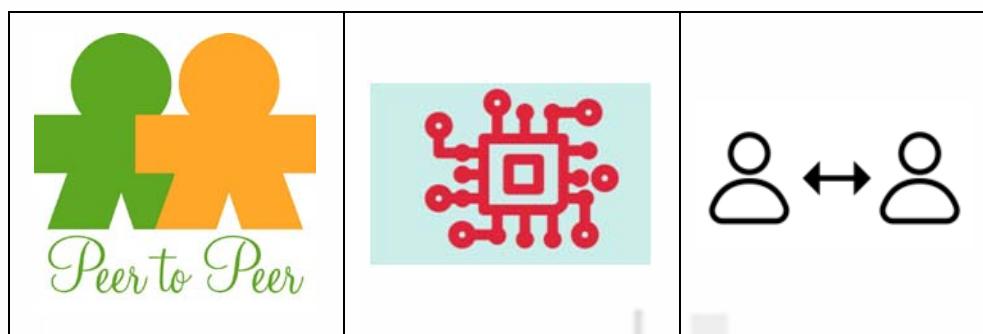


Fig 1.10: P2P Business Model

The absence of a ‘third party’ may increase the risk of service not being delivered, service being of poor quality, delay or refusal of payment as well as exploitation of asymmetric information. This added risk generally results in increased transaction costs for the parties involved. Another variation of ‘P2P’ models could be without any economic transactions for buying and selling, but simply provide a platform or individuals to interact for various ends. These services may be operated as free non-profit services or generate revenue by advertising to users or by selling users data. Some examples of ‘P2P’ services are open-source software, online marketplaces, cryptocurrency and Blockchain, ridesharing and so on.

10.5.8 D2C: Direct-to-Consumer Model of E-Commerce

Direct-to-consumer refers to selling products in a straight line to customers, bypassing any third-party retailers, wholesalers, or any other middlemen.

Direct-to-consumer companies are transforming how people shop. In the progression, these brands, spanning everything from detergent to sneakers, are radically changing consumer preferences and expectations. In addition to establish a direct relationship with customers, these brands are building a community of ambassadors on social media.

D2C brands are usually sold online only and specialize in a specific product category: Casper, Warby Parker, Everlane, Harry’s, Outdoor Voices, AWAY, and Dollar Shave Club.



Fig 1.11: D2C Business Model

Check Your Progress A

- 1) State the type of E-Commerce system:
 - i) The companies involved come together to conduct business with each other.
 - ii) It is a type of commerce where a consumer provides goods, services and products to an organization or business.
 - iii) Business sells their goods, services and products directly to the consumer via the internet.
 - iv) E-commerce process followed by the consumers when interacting directly with the government agencies.
- 2) What do you mean by e-Commerce?
.....
.....
.....
.....

1.6 ADVANTAGES AND DISADVANTAGES OF E-COMMERCE

There are no doubts in the minds of the stakeholders of e-Commerce about its ability to make businesses more profitable due to its capacity to sell goods, services online. At the same time, there are multiple factors to keep in mind too.

Table 1.1: Comparative view of Advantages & Disadvantages

Advantages	Disadvantages
The e-shop is open 24 hours a day, 7 days a week.	When ordering a product online, it often takes longer delivery time and more shipping charges.
Customers don't need to stand in queues of stores.	Repaying your online purchase may be more difficult than buying a traditional store.
Larger product selection.	Online shopping will not be able to measure goods.
Possibility to shop from anywhere.	Money security of the customers depend on their own vigilance.
Attractive discounts are offered.	Lack of privacy.

It is necessary to look upon its advantages and disadvantages to be able to rationally decide and make strategic decisions.

1.6.1 Advantages of E-Commerce

The various advantages of E-Commerce are discussed below:

- 1. Accelerated buying process for saving time:** One of the problems conventional stores face is the delay in buying by a consumer during the problem of accessing a physical store which may or may not be available. E-Commerce overcomes this hurdle by aiding the consumer avail the specific product at their own pace and with ease. It helps the consumer choose from a wide range of products by making available goods from other chained stores as well, widening the net of available goods as well fast forward the process to process payments. With the availability of a wide range of options from a spectrum of vendors, e-Commerce not only aids in diversification of the marketplace, but also helps access the online global market. All these processes also aid in reducing travel and delivery time of the products.
- 2. Personalised store as per Consumer preference:** A major asset of conducting online business is the enhanced shopping experience. As each user is introduced to a different first page based on their location and advanced search for conducting a purchase. The consumer's history of purchases also reflects in the personalized experience of online commerce. This allows consumers to avail special services like benefits and discounts due to their loyalty, order history and so on, hence fulfilling customer expectations.
- 3. Reduce recurring cost while hiring virtual support resources:** One of the key factors that aids in reducing cost when it comes to e-commerce is the outsourcing of tasks to even different countries or employees for use to many other e-commerce businesses. This makes the presence of a company possible in multiple locations possible at a fraction of the cost of physical presence.

4. **Customers retargeting is easier:** Retargeting a customer is a key part of retaining a customer base. Below are some of the techniques which can be used to retarget customers:-
 - It is a good strategy to share a coupon when customers leave the checkout page.
 - By sending emails which are pitching upsell and cross-sell.
 - By redirecting the consumer to the desired web page or targeted advertisement based on Consumer data.
5. **Easier to encourage an impulse buy:** Impulse buying is an important tool in the arsenal of the sellers where it works as a path for consumers to act as per their choices towards particular products. It plays on the psychological behaviour of humans where some of us have personality traits that encourage impulse buying. It is often because of the urge to feel good, and at the same time the attempt at deriving emotional value from certain products makes them feel good; or things that have an emotional value.
6. **Reviews Available:** The review system allows the consumer to make decisions as well as pass judgement on a wide range of variables. The presence of positive comments or a higher rating of one's business not only adds value, it also builds trust of the consumer on the product as well as the business. This not only projects the business as transparent, it helps the consumer to voice their opinion about their choices in products.
7. **Detailed information available for the consumer:** The availability of detailed information is one of the key strengths of e-commerce. All consumers are always seeking detailed insights into the product they are interested in as it aids them in making an informed decision. The availability of information allows the consumer to gauge the relevance and value of the product or service according to their needs. It is the detailed description of the product that helps the consumer to make a confident choice according to their requirements.
8. **Quality service at reasonably low operation cost:** Operational costs are a major expenditure when it comes to asserting the physical presence of any businesses. Usually for a business to maintain a physical presence, they have to pay a lot of money in the form of rent, salaries for employees, maintenance and other expenses. E-Commerce plays an important role in reducing the cost of operations significantly by eliminating a significant part of that expense as the business does not have to rely on a physical presence to provide quality service.
9. **Quick and affordable marketing:** E-commerce provides a cost effective way to businesses for marketing anything effectively. This is in contrast to the expensive and time consuming processes used in physical marketing practices. Some pointers for understanding marketing techniques are listed below:

- Availability of quality content for attracting the customers, it is an important factor for being more visible or noticeable in the market.
- Creative marketing videos explaining the product and services for better understanding.
- Social networking is important for asserting one's presence everywhere and helps in the development of popularity for a product.
- Employing different tricks to reach the customers, which is easy through digital marketing techniques.

10. E-Commerce has flexibility with 24/7 service capability: Flexibility in terms of both accessibility and affordability are major areas where Ecommerce is powerful than conventional stores and retail spaces as it allows the service to consumer 24/7. It is not only the capability of providing a shopping option round the clock, E-Commerce also helps consumers with chat support, provide recommendations and identify products being sought by the consumer at any time and place.

1.6.2 Disadvantages of E-Commerce

The various disadvantages of E-Commerce are discussed below:

1. **Lack of personal touch:** One of the things that play a huge role in consumer satisfaction is the ability to personally view and touch any product. It is an important factor when it comes to customer satisfaction as even the best detailed, expressed and explained products can fail to convince and attract the consumer.
2. **Unsure about the quality:** When it comes to purchasing products online, it is difficult for the consumer to determine its quality. It is also common knowledge that there has been malpractice when it comes to fake reviews to artificially boost sales and of a low quality or faulty product.
3. **Late Delivery:** One of the assurances of businesses practicing E-Commerce is the delivery time of the product. There are a whole range of issues that can arise when it comes to the delivery of the purchased product; hence businesses avoid giving exact delivery dates and try providing windows for the same. Many times, this results in the consumer waiting for the product for more than the assured period of time.
4. **Difficulty in purchasing some products:** Some precious products such as gold and customised products like made-to-order furniture (because of measurement issues) are difficult to be purchased online. Trust is an important factor when it comes to these products, and the lack of ability to verify them physically could serve as a hindrance in purchasing such products online.

5. **Site crash issues:** There is still some uncertainty when it comes to the functioning of servers and the availability of round the clock and quality internet service. This can create a lot of hindrance from sales perspective, and can result in loss of consumers as they might have to wait for an unspecified period of time to proceed with transactions.
6. **Cybercrime and Data privacy issues:** Last but not the least, e-commerce is prone to cyber security threats as well as data breaches typical to the cyber world. E-commerce web portals store users' data including financial and other personal details of the buyers and the sellers. Hence there is a constant challenge of securing this data from a wide range of security challenges including malware, hacking, ransom ware as well as misuse of personal sensitive information / preferences for targeted marketing / campaigning etc.

Check Your Progress B

- 1) What are the techniques which can be used to retarget customers?

.....
.....
.....
.....
.....

- 2) How does the E-Commerce ensure flexibility?

.....
.....
.....
.....
.....

- 3) “E-Commerce has flexibility with 24/7 service capability.” Comment.

.....
.....
.....
.....
.....

- 4) How does using E- Commerce lead to saving of cost and time?

.....
.....
.....
.....

1.7 LET US SUM UP

E-commerce is a concept that explains and elaborates upon the idea of buying and selling of products, goods, services and information using computer including Internet.

There are various advantages of e-commerce for the buyers such as it provides detailed information, accelerates buying process, personalises store as per their preferences, reduces recurring cost, while hiring virtual support resources for the consumer, etc.

For the sellers, it offers opportunities to expand business processes, reach new customers, and reduce costs while developing new models and markets for business organizations across the board.

Generally, there are eight different types of e-commerce models namely; B2B (Business-to-Business), B2C (Business-to-Consumer), C2C (Consumer-to-Consumer), C2B (Consumer-to-Business), B2G (Business-to-Government/Administration), C2A (Consumer-to-Administration) and P2P (Peer-to-Peer) and D2C (Direct-to-Consumer).

There are various disadvantages of e-commerce such as it lacks personal touch, when it comes to purchasing products online, it is difficult for the consumer to determine its quality. E-commerce is prone to cybercrime and unauthorised data access typical to the cyber world.

1.8 KEYWORDS

- **B2B (Business-to-Business):** This form of E-Commerce is understood to be of the kind that takes place between companies. In the Business-to-Business type of E-Commerce system, the companies involved come together to conduct business with each other.
- **B2C (Business-to-Consumer):** This model of E-Commerce is understood to be the process where a company or business sells their goods, services and products directly to the consumer via the internet.
- **C2A (Consumer-to-Administration):** The model refers to the E-Commerce process followed by the consumers when interacting directly with the government agencies.
- **C2B (Consumer-to-Business):** It is a type of commerce where a consumer provides goods, services and products to an organization or business.
- **C2C (Consumer-to-Consumer):** This form of E-Commerce is understood to be a model where consumers sell goods, services and products to another consumer via web technologies and the internet.
- **D2C (Direct-to-Consumer):** The D2C e-commerce model quite literally “cuts out” the middleman. D2C e-commerce is when the manufacturer/

producer sells its products/produce directly to consumers from their web store.

- **P2P (Peer-to-Peer):** This model of E-governance refers to a distributed platform enabling different individuals to partake in transactions with each other without an intermediary third party via a P2P service.

1.9 ANSWERS TO CHECK YOUR PROGRESS

A 1)

- i) B2B (Business-to-Business)
- ii) C2B (Consumer-to-Business)
- iii) B2C (Business-to- Consumer)
- iv) C2A (Consumer-to-Administration)

1.10 TERMINAL QUESTIONS

- 1) Explain the evaluation of E-Commerce.
- 2) What are the advantages of E-Commerce?
- 3) What are the disadvantages of E-Commerce?
- 4) Explain any 5 different types of E-Commerce systems.



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 2 E-COMMERCE BUSINESS MODELS

Structure

- 2.0 Objectives
- 2.1 Introduction
- 2.2 What is a Business Model?
- 2.3 Key Elements of a Business Model
- 2.4 e-Commerce Business Models to Understand Target Customer
- 2.5 e-Commerce Design Models
- 2.6 Implementing e-Commerce Models
- 2.7 e-Commerce Revenue Models
- 2.8 Impact of COVID on e-Commerce
- 2.9 Let Us Sum Up
- 2.10 Keywords
- 2.11 Answers to Check Your Progress
- 2.12 Terminal Questions

2.0 OBJECTIVES

After studying this unit, you should be able to:

- understand the meaning and concept of the term ‘business model’;
- understand the key elements of a business model;
- understand how e-commerce is designed;
- understand how e-Commerce is implemented;
- understand how e-Commerce generates revenue; and
- understand how pandemic had a direct impact on e-commerce business.

2.1 INTRODUCTION

We understood in the previous unit on “Basics of e-Commerce”, that how our digital devices like computers, tablets, or smart phones could be considered akin to digital version of mail-order catalogue shopping. Ranging from mundane products like grocery items, stationary items, cosmetics to aeroplane tickets, buy and sell services, to financial and government services, everything is now available on online stores. There is hardly any imaginable product or service that is not available through e-commerce websites/ stores/ platforms/ apps.

Indeed, e-commerce is a newer format of conducting businesses that permits consumers to buy products/services over Internet and empowers business entities (retailers, wholesalers or suppliers etc.) to sell things over Internet.

In the present unit, we would try to understand how e-commerce works with special reference to its business model and its key elements. We also try to understand other models that support the design and implementation of e-commerce. In continuation we would also study what are the various possibilities of generating revenue by these online shopping stores. All subsequent models (design models, implementation models and revenue models) are important constituents of the bigger concept of defining the business model of e-commerce. In general, Government of India identified two categories of e-commerce business models one is related to ‘Informational/Communicational Design Strategy’ and the other category is related to ‘On-line Transactional Design Strategy’.

2.2 WHAT IS A BUSINESS MODEL?

A business model is like a business plan conceived by a company so that the company has an edge over its competitors and can make profits but it is over and above a business plan too. It is also about specifying exact strategies and approaches of initiating and sustaining the proposed business plan.

Its key focus stays on sustaining the proposed business by specifying ways and means to create on-going value for the desired customers.

Some key questions that need to have answers include:

- Who are going to be the target beneficiaries of the business?
- What is the key unique proposition of the business?
- How will the business idea be implemented?
- How will it generate revenues?
- How will it interact with customers to deliver products/services?

First and foremost, a business plan must clearly delineate who the target customer is, then highlight the differentiating product or a service that the identified customer would seek, also called the USP – Unique Selling Proposition, that would be unique to this business and would give an edge over its competitors.

After that, a business model should move on to describe all the elements that are required to demonstrate the feasibility and success of a prospective business.

Therefore, business plan should ideally include several details including target customer, description of the goods, details of the services that the company has to offer, marketing strategy, revenues and expenses, start-up costs, sources of financing and so on. To address such and related concerns , a business model must be a detailed description related to following components:

- i. Core business focus (why are we doing the business, who is our target customer)
- ii. Design priorities (why are we going online – to improve our brand positioning, to promote the business across various geographies, to eliminate intermediaries or all)

- iii. Implementation strategies (how would this business go online, directly or through existing online aggregators etc.)
- iv. Revenue mechanisms (how the money flows – directly through sales or advertisements etc.) driving that business.

2.3 KEY ELEMENTS OF A BUSINESS MODEL

To ensure that all these basic questions are adequately addressed, following are some simple steps to create a strong business model.

- 1. Identify your specific audience:** Targeting a wide audience won't allow a business to identify the right customers, who truly need and want the product or service. Instead, when creating a business model, narrow down the audience (expected buyers) number to two or three and do detailed study of the buyer personas. Outline each persona's demographics, common challenges and the solutions of the company that it will offer.
- 2. Establish business processes:** Before the business can go live, make a clear understanding of the activities required to make the business model work. It is important to determine the key business activities to establish a proper business process. The first step is to identify the core aspects of the business's offering.
- 3. Record key business resources:** What does a company need to carry out during daily processes, find new customers and reach business goals? Document essential business resources to ensure the business model is adequately prepared to sustain the needs of the business. Common example that a business may need includes a website, capital for the business to start running, warehouses, intellectual property and the customer lists.
- 4. Develop a strong, preferably a unique value proposition:** For standing among other competitors a company needs to provide some additional value proposition to the customers in the form of an innovative service, or a revolutionary product. Value proposition is about giving the value to the business and how it stands out from other businesses in the market. Once the business has got a few value propositions, then it is important to link each of them to a service or product delivery system to determine how the business would remain valuable to the customers over time.
- 5. Determine key business partners:** No business can function properly (let alone reach established goals) without key partners that contribute to the business's ability to serve customers. While building a business model it is significant to choose the key partners like for example suppliers, strategic alliances, or advertising partners.

Keeping these five elements in mind, will lead to the creation of a solid business model capable of fuelling the success of a new business entity.

Once we are clear about what a business model is and how it is created, we shall move on to apply this basic knowledge in understanding this from the perspective of an e-commerce business.

Typically for an e-commerce business, a clearly defined business plan usually must include following four subtypes of related models:

- a. **Customer Based Business Model** - Model that would help decide who is the ultimate target beneficiary of the proposed e-commerce initiative.
- b. **Design Model** –Model that would help to decide the priority for designing the proposed e-commerce website.
- c. **Implementation Model**–Model that would decide how we implement the proposed e-commerce initiative including how we reach our customers, how we sell them, how we transact a sale, how the products/ services are distributed, how we deliver the products/ services.
- d. **Revenue Model**–Model that would help us to generate revenue for the e-commerce initiative as well as for the organisation/enterprise responsible for launching the E-Commerce portal.

2.4 E-COMMERCE BUSINESS MODELS TO UNDERSTAND TARGET CUSTOMER

Choosing and applying the right e-commerce business model is complicated—especially if it is a new product / service not been launched by anybody else. These models vary depending on the target customer (or ‘buyer’), available resources, and capabilities of both the seller and the customer.

For an easy revision, the general e-commerce business models, based on the category of the customers are summarised herewith.

1. **Business-to-Business (B2B):** Business-to-business (B2B) e-commerce portal is the one where the business is conducted between two business entities using this portal, such as between a wholesaler and retailer. The retailer could connect to the customer separately, using another online store or using a physical store.

As is evident, B2B transactions happen, where one business entity, say an automobile company purchases its varied accessories from various suppliers using a dedicated web portal/website/app. For example, Toyota motors have their own B2B web portal to connect to all its business partners which is not accessible to the individual buyers.

Drop Box is a service based B2B e-commerce model where all the team members have access to the work account created in Drop Box to store, share, and collaborate on files.

2. **Business - to - Consumer (B2C):** B2C model of e-commerce is primarily for those business entities (retailers, whole sellers and manufacturers) who want to sell their products(or services) directly to their consumers using online stores. For example, Laxme India is a product based B2C FMCG company that has its online presence too in India to connect to its customers.
3. **Consumer - to -Consumer(C2C) :**When individuals want to sell their own services , or a product (usually the used / second hand/ pre-owned products) using Internet then they use C2C e-commerce web sites/ portals such as OLX, eBay, Craigslist and so on. These C2C online

stores often use classified advertisements or may use online bidding / auction systems to attract the buyer-customers.

4. **Consumer- to - Business (C2B):** In the C2B model, individuals (customers) sell their products or services to a business. Using this model, a business entity can typically extract values from the customers by taking their business suggestions or by getting their feedback or reviews on the existing products.

Apart from gathering feedback or reviews or press releases written by consumers for consumers, there are dedicated freelancer C2B platforms like ‘Up work online transaction platform’ and ‘Fiverr’ who ‘crowd source’ freelancing services from individuals and pass it on to the businesses who need it, obviously on contract and short-term basis.

Also, C2B concept is also used to monetise the ‘influencing’ quotient of a popular individual to ‘sell’ or ‘brand’ a business. Influencers with high social media following, encourages their fans and followers to buy a particular product/service or to take an action. With present social media hype, influencer-matching marketplaces like ‘Ifluenz’ are on the rise as new, innovative forms of C2B. In India, ‘Influencer.in’, ‘Plixxy’ and ‘Chat box’ are some of the popular influencer marketing platforms.

On the similar lines, there are other possibilities of an e-commerce business such as Business - to - Government (B2G), Government - to - Business (G2B), Government - to - Citizen (G2C) and so on.

Once the customer has been identified and a suitable model picked up, we move on to define the design and implementation models of e-commerce.

2.5 E-COMMERCE DESIGN MODELS

The four models that are associated with the informational/communicational design are:

- a. Brand awareness and image building model
 - b. Promotion model
 - c. Info-mediary model
 - d. Customisation model
- a. **Brand awareness and image building model:** Web sites that are using this model provide detailed and rational information about the firm and its offerings. The model reaches motivated and desperate customers with an information/image-rich communications message. In this type of model, the entry barriers are low, so, smaller firms can set up this kind of site as well. The website of Ford (www.ford.com) and Reebok (www.reebok.com) are examples of brand awareness and image-building models. As the website of ‘Ford’, not only lists all the models of its seven famous automotive brands, but also posts about its environmental policy, cleaner manufacturing, community involvement, and corporate citizenship report.

Similarly, the website of Reebok lets its visitors read about sports and fitness, hear from Reebok-sponsored athletes, and learn more about Reebok's human-rights activities, among other things.

- b. Promotion model:** This website model is based on lucrative 'advertisements', which are attracting a potential customer to a site. Sometimes, this model tries to provide free digital gifts such as discount coupons, cash backs, gift cards, photography tools, etc. The website of 'Kodak' (www.kodak.com) is an example of the promotion model because it provides technical help and tutorials for its digital cameras and offers a library of colourful, high-quality digital images that are made downloadable.
- c. Info-me-diary model:** The term 'Info-me-diary' is a composite of two terms – 'information' and 'intermediary'. This website model aggregates information from multiple electronic commerce retailers (intermediaries) and provides services of searching and comparison for Internet customers. This model sometimes offers free Internet access or free hardware in exchange for detailed information about customer's surfing and purchase habits. The collected customer data is valuable and is used for designing customized products and for target marketing campaigns.

Some firms even work as info-me-diaries by collecting and selling information to other businesses.

This model also provides consumers with useful information about the Web sites in the market segment. 'Just dial' (www.jstdial.com) is an example of the info-me-diary model, this company provides local search for different services in India over the phone and online. The user just needs to register on the website. By tracking the users' surfing pattern info-mediary model provides the useful information to the user

- d. Customisation model:** This model provides customers with content that is customised to meet their preferences by employing AI/ML algorithms. By completely customising information needs, an e-commerce website built on this model becomes highly attractive to its visitors.

2.6 IMPLEMENTING E-COMMERCE MODELS

Once the end customer of e-commerce has been identified, the next important thing is to understand how e-commerce models are implemented. These e-commerce implementation strategies constitute a part of the business model and to know that how activities like inventory management and sourcing of products are undertaken at the back-end of an e-commerce implementation.

There are many possibilities to this too, such as manufacturing and storing products by the same business entity or may be finding another business partner to do the manufacturing, stocking and so on. Based on such possibilities, there are several-commerce implementation strategies such as Retail Model, Brokerage Model, Mall Model, Drop Shipping Model, Warehousing and Whole selling Model, Private Labelling, and White Labelling Models and so on.

1. **Retail Model:** When retailers directly use Internet to sell products/services using Internet, it is also called ‘*e-tailing*’ (electronic-retailing) and such a retailer is also called an ‘*e-tailer*’. e-Tailing stores could either be a complete substitute for brick-and-mortar (the physical) retail stores. However, some companies choose to maintain both- the physical (brick and mortar) stores as well as its online marketplace too.
2. **Brokerage model:** Brokers are mediators; they bring buyers and sellers together and facilitate transactions between buyers and sellers vary with the type of e-commerce *viz* business-to-business (B2B), business-to-consumer (B2C), or consumer-to-consumer (C2C) markets. A broker makes its money by charging a fee for each transaction it enables.
3. **Mall model:** An e-mall hosts many on-line merchants. The mall typically charges setup, monthly listing, and/or per-transaction fees.
4. **Manufacturer model:** This model is based on the power of the Web to allow manufacturers to reach buyers/customers directly and thereby compress the distribution channel.
5. **Drop Shipping Model:** Drop shipping is probably the most popular form of e-commerce implementation strategy where the items are dispatched straight to customers by the supplier. A simplified life cycle of drop shipping (Fig 2.1) includes following steps:
 - i. An online storefront could be opened by a drop-shipping company, where a catalogue of products and services of different suppliers is displayed for the customer, product-wise, category-wise, pricewise and so on. For example, in India we have several drop shopping companies like *Indiamart*, *Trade India* and *Baapstore*, where a supplier could upload their items.
 - ii. A supplier (or even the retailer or a manufacturer) could collaborate with any of the existing drop shipping companies to upload their own products on this online storefront.
 - iii. Customer places the order on online storefront.
 - iv. The drop shipping company transacts with the customers through digital payment options such as credit cards and so on.
 - v. These order details are passed on to the supplier.
 - vi. The supplier packs and ships the ordered product directly to the customer.

As is obvious from these lifecycle steps, supplier has the main responsibility in Drop-Shipping. It is the supplier who must discharge prime business activities including inventory management, warehousing, packaging and so on.

There are also several limitations of this model as well, such as the drop shipping platform must keep track of supplier-wise customer orders and financial transactions and each supplier too must maintain exact shipping information of the customer.

This e-commerce model is best suited for those suppliers, retailers and manufacturers who have perfect products or services, but do not have enormous cash to create a separate e-commerce portal. Similarly, it is good for those business entities who have vision, digital know how and resources to create an online store but no inclination to manufacture their own products, or maintain their own warehouses and factories.



Source: <https://www.ecommerceceo.com/types-of-e-commerce-business-models>

Fig 2.1: Drop Shipping

6. Wholesaling And Warehousing Models: is one such model, where a variety of products (and services) are available on the online store. Obviously, to maintain these huge volumes, investment in massive physical warehouse spaces is required but the principle of ‘economy of sales’ assures profits, especially since both retailers and consumers could approach such an online store. Keeping track of orders received could be tough in this model, unless well supported by the related software.

7. Private Labelling and White Labelling: There is another possibility of an e-commerce online store where individuals / designers / cottage industries could ‘seek’ reputed brand labels for their products. This is called ‘private labelling’. Such kind of private labelling e-commerce portal brings together designers - who can’t afford to manufacture products themselves and ‘manufacturers or ‘well-established’ brands who want to diversify using innovative designs/ ideas.

Indiamart.in provides this facility for a range of products. For example, products / formula of a small, herbal cosmetic product manufacturer could be ‘private labelled’ by a reputed brand through *Indiamart.in*.

White labelling is just the reverse of private labelling. In this model, the product of an existing brand could be re-packaged and labelled and sold by another business entity.

It is relevant to point out that these are just some of the popular implementation strategies of e-commerce and that in wake of emerging technology trends and also because of excessive digitilisation popularised

during COVID times, several variations to these basic implementation strategies have been adopted by the e-commerce business entities.

Check Your Progress A:

- 1) What is a business model?

.....
.....
.....
.....
.....
.....
.....

- 2) Differentiate between Private Labelling and White Labelling.

.....
.....
.....
.....
.....
.....
.....

- 3) Fill in the blanks with appropriate words:

- i) A is an idea conceived by a company for making profits.
- ii) is about giving the value to the business and how it stands out from other businesses in the market.
- iii) is the one that would help to decide the priority for designing the proposed e-commerce website.
- iv) that are using this model provide detailed and rational information about the firm and its offerings.
- v) The term ‘Info-me-diary’ is a composite of two terms and

2.7 E-COMMERCE REVENUE MODELS

E-commerce not only involves doing business over the internet, it is also about designing new profitable business models. After we have understood some of the important implementation strategies for e-commerce businesses, we would move on to understand possible modes of income generation in e-commerce implementation. This is best explained by the revenue model defining the e-commerce implementation.



Fig 2.2: E-commerce revenue models

A revenue model is a part of the business model that essentially explains different mechanisms of income generation and its sources.

1. **Advertising Revenue Model:** Revenue in e-commerce businesses could be primarily generated by hosting advertisements of other products/services on online stores; this is the most basic model of revenue generation referred as Advertising Revenue Model.

This model provides content and services like email, chat, etc mixed with advertising messages in the form of banner ads. The advertising model only works when the volume of viewer traffic is large or high. The banner ads may be the major or sole source of revenue for the broadcaster.

There could be several variations of this revenue model such as display-marketing, affiliate-marketing (advertising on many websites), search-engine-marketing (also called ‘cost per click’ or CPC model), e-mail marketing and social-media-marketing. Google and Facebook primarily operate using this revenue model.

2. **Affiliate Revenue Model:** It is a very popular variation to the advertising revenue model that is based on pay-for-performance concept. In this concept the sellers put advertisement of their products as ‘links’ on websites of their partners, also called affiliates. Payments are made to the sellers when the links are clicked, and orders are placed and in return the partners/ affiliates get some part of the revenue.
3. **Subscription Revenue Model:** Another very popular concept of generating revenue is to offer some basic free services but store has a subscription amount, payable either monthly, or quarterly or annually.

That means that premium services of the e-commerce portal are available only to the subscribers (also called members). Users pay for access to the site. High value-added content is essential. Eg Over-The-Top (OTT) video streaming platforms like Netflix operate using subscription revenue model.

4. **Transaction Fee Revenue Model:** There are certain e-commerce sites, such as OLX, e-bay who charge a transaction fee from its users. This transaction could be either fixed or could be in terms of percentages of the volume of transactions undertaken.
5. **Sales Revenue Model:** Sale of products/ services itself generates revenues for the sellers (who could be a retailer or wholesaler) who sell their products online.

There could be several more variations of the aforementioned revenue models by combining and improving these basic models. Since the e-commerce world is evolving very rapidly, newer variations of revenue models are expected such as group-buying, target campaigning, content - syndication, monetisation of personal sensitive data etc and so on. Understandably not all could be considered as pleasant variations and it would need more strict legal enforcements at national and global levels.

2.8 IMPACT OF COVID ON e-COMMERCE

The corona virus pandemic has considerably changed the shopping behaviour of consumers for two valid reasons- firstly the shopping sprees got reduced due to lockdowns and secondly the downward spiral of economy curtailed the expenditures.

However, in this transition, online stores became more popular. Even those who had not gone online to shop now realised that they could buy essential commodities from the safe confines of their homes. These FTUs (First Time Users) on e-commerce sites also suddenly became aware of massive discounts/ bargain deals available online, which probably would have never come their notice earlier. As a result, quite a lot of consumers have switched from shops, supermarkets, and shopping malls to online portals for the purchase of products, ranging from basic commodities to branded goods, even when the covid-imposed lockdowns have been lifted.

However, this is just the tip of the ice-berg- COVID and Digitilisation have more to unfold in e-commerce sector than what we can see now. Only future would tell.

Check Your Progress B:

- 1) What is a revenue model?

.....
.....
.....

- 2) How has the corona virus pandemic considerably changed the shopping behaviour of consumers?

.....
.....
.....
.....

- 3) State whether the following statements are True or False:

- i. Advertising Revenue Model is based on pay-for-performance concept.
- ii. Business model is developed keeping in mind the revenue earned over the previous years.
- iii. A revenue model is a part of the business model that essentially explains different mechanisms of income generation and its sources.
- iv. The shopping behaviour of consumers has remained constant the corona virus pandemic.
- v. The advertising model only works when the volume of viewer traffic is large or high.

2.9 LET US SUM UP

A business model is like a business plan conceived by a company so that the company has an edge over its competitors and can make profits but it is over and above a business plan too. It is also about specifying exact strategies and approaches of initiating and sustaining the proposed business plan. Its key focus stays on sustaining the proposed business by specifying ways and means to create on-going value for the desired customers.

There are some simple steps to create a strong business model namely; Identify your specific audience, Establish business processes, Record key business resources, Develop a strong, preferably a unique value proposition, and Determine key business partners. Keeping these five elements in mind, will lead to the creation of a solid business model capable of fuelling the success of a new business entity.

Typically for an e-commerce business, a clearly defined business plan usually must include following four subtypes of related models Customer Based Business, Design Model, Implementation Model and Revenue Model.

There are four models that are associated with the informational/communicational design namely; Brand awareness and image building model, Promotion model, Info-mediary model and Customisation model.

Once the end customer of e-commerce has been identified, the next important thing is to understand how e-commerce models are implemented. These e-commerce implementation strategies constitute a part of the business model and to know that how activities like inventory management and sourcing of products are undertaken at the back-end of an e-commerce implementation.

There are many possibilities to this too, such as manufacturing and storing products by the same business entity or may be finding another business partner to do the manufacturing, stocking and so on. Based on such possibilities, there are several e-commerce implementation strategies such as Retail Model, Brokerage Model, Mall Model, Drop Shipping Model, Warehousing and Whole selling Model, Private Labelling, White Labelling Models and so on.

A **revenue model** is a part of the business model that essentially explains different mechanisms of income generation and its sources. It has various types namely; Advertising Revenue Model, Affiliate Revenue Model, Subscription Revenue Model, Transaction Fee Revenue Model and Sales Revenue Model.

The corona virus pandemic has considerably changed the shopping behaviour of consumers for two valid reasons- firstly the shopping sprees got reduced due to lockdowns and secondly the downward spiral of economy curtailed the expenditures.

However, in this transition, online stores became more popular. Even those who had not gone online to shop now realised that they could buy essential commodities from the safe confines of their homes. These FTUs (First Time Users) on e-commerce sites also suddenly became aware of massive discounts/ bargain deals available online, which probably would have never come their notice earlier. As a result, quite a lot of consumers have switched from shops, supermarkets, and shopping malls to online portals for the purchase of products, ranging from basic commodities to branded goods, even when the covid-imposed lockdowns have been lifted.

2.10 KEYWORDS

Business Models: A business model is an idea conceived by a company for making profits. The business model is developed keeping in mind the idea of differentiating the product or service from its competitors.

Customer Based Business Model: Model that would help decide who is the ultimate target beneficiary of the proposed e-commerce initiative.

Customisation model: This model provides customers with content that is customised to meet their preferences by employing AI/ML algorithms.

Design Model: Model that would help to decide the priority for designing the proposed e-commerce website.

Drop Shipping Model: Drop shipping model is probably the most popular form of e-commerce implementation strategy where the items are dispatched straight to customers by the supplier.

E-commerce: E-commerce is a concept that explains and elaborates upon the idea of buying and selling of products, goods, services and information via computer including the internet.

Implementation Model: Model that would decide how we implement the proposed e-commerce initiative including how we reach our customers, how

we sell them, how we transact a sale, how the products/ services are distributed, how we deliver the products/ services.

Info-me-diary model: This website model aggregates information from multiple electronic commerce retailers (intermediaries) and provides services of searching and comparison for Internet customers.

Manufacturer model: This model is based on the power of the Web to allow manufacturers to reach buyers/customers directly and thereby compress the distribution channel.

Pandemic: A disease that is prevalent over a whole country or the world.

Promotion model: This website model is based on lucrative ‘advertisements’, which are attracting a potential customer to a site.

Revenue Model: Model that would help us to generate revenue for the e-commerce initiative.

2.11 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A

3. i. Business model ii. Value proposition iii. Design model
iv. Websites v. Information; Intermediary

Check Your Progress B

2.12 TERMINAL QUESTIONS

- 1) State the various key elements of a business model.
 - 2) What are steps to create a strong business model?
 - 3) Explain Drop Shipping Model? Would emerging technologies have any impact on implementation strategies of e-commerce? Justify
 - 4) State the impact of a pandemic on E-commerce businesses.
 - 5) Explain the four models that are associated with the informational/communicational design.
 - 6) Who are Digital Influencers and under which category of e-commerce business model they could be considered?
 - 7) What are e-Commerce revenue models? Explain their various types.



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 3 TECHNOLOGY USED IN E-COMMERCE

Structure

- 3.0 Objectives
- 3.1 Introduction
- 3.2 Design Considerations of E-commerce
 - 3.2.1 Design of E-commerce Website
 - 3.2.2 Easy Navigation
 - 3.2.3 Simple Checkout
 - 3.2.4 Logistics
 - 3.2.5 Good Product Pages
- 3.3 Essential Technology Features Required
- 3.4 Difference between App based and web-based business
- 3.5 Building, Designing and Launching E-Commerce Website
- 3.6 SDLC cycle for designing e-commerce solutions
 - 3.6.1 Hardware
 - 3.6.2 Software
 - 3.6.3 Outsourcing vs In-house Development of Application
- 3.7 Architectural Framework and Network Infrastructure
 - 3.7.1 Architectural Framework of E-Commerce
 - 3.7.2 Domain Name System
 - 3.7.3 Web Servers Implementation
- 3.8 Impact of Emerging technologies on E-commerce
- 3.9 Digital Platforms and E-commerce
- 3.10 Digitalisation and Digital Transformation in Businesses
- 3.11 Let Us Sum Up
- 3.12 Key Words
- 3.13 Terminal Questions

3.0 OBJECTIVES

After studying this unit, you should be able to:

- list the building blocks of e-Commerce;
- understand the difference between app based and web based business;
- know the features of technologies used in e-Commerce;
- understand how to build, design & launch e-Commerce website;
- differentiate between app based and web based business;
- understand the impact of emerging technologies of e-commerce with special reference to Platform Economy.; and

- Understand the concept of Digital Transformation with special reference to Commerce.

3.1 INTRODUCTION

In the last decade, the way of doing business has totally revolutionized. The reason for drastic change is the emergence of new technologies and the merging of Internet facilities with these new technologies. The Internet has produced a number of innovations in the business between commercial organizations, between individuals and commercial organizations, and between individuals and individuals. These transactions are usually known as business-to-business (B2B), business-to-customer (B2C), and customer-to-customer (C2C) e-commerce.

The advancement in technologies impacted the e-commerce industry drastically; it has transformed the way consumers connect with brands. Now the customers feel more empowered as they can buy anything just with a click of a mouse, can shop more cost-effectively, track orders, find the best deal by comparing different portals and get the convenience of getting products delivered to their doorstep. All this is possible because of the emergence of new technologies, as a result now e-commerce companies are getting nearly global adoption because customers can buy products from anywhere and at any time as per their ease.

3.2 DESIGN CONSIDERATIONS FOR E-COMMERCE

None of the e-commerce applications would be possible without some basic design considerations. Attracting visitors and making them convert into customers is the real challenge. The basic design considerations, which, when set up right, will pave the way to a prosperous online business. Five important design considerations of e-commerce are discussed below:

3.2.1 Design of e-commerce Website

The design of the portal is most important, never underestimate it. The customers who visit the site should be able to find exactly what they're looking for as soon as they arrive. E-commerce portal should be such that it is fast and responsive to customers' needs, web pages should load quickly and provide smooth, intuitive navigation across all electronic devices (desktops, tablets, and smartphones).

3.2.2 Easy navigation

Easy-to-use navigation is essential for any website and even more so for online shopping. Customers prefer e-commerce portals that are spontaneous to their queries and give quick responses to what they are looking for. If the product descriptions are not properly provided on the shopping menu of an e-commerce portal, then there are high chances of losing the customers.

3.2.3 Simple checkout

Technology Used in
E-Commerce

Like navigation, the checkout process should be smooth, if it involves too many steps and clicks, the risk is that the customer just gets frustrated and gives up before completing the purchase. There should be the facility for payment through different payment options such as through net banking, digital wallets, debit/credit cards, and COD (Cash on Delivery). The payment process should be transparent and clearly state the shipping charges, taxes, and any other fee if applicable; there should not be any hidden fee at the time of product delivery.

3.2.4 Logistics

Logistics management is one of the key consideration points for doing business either locally or around the globe. Proper logistics should be in place to receive and fulfill orders.

3.2.5 Good Product Pages

The product page is the crucial element of any e-commerce portal, it has the power to convert a ‘visitor’ into ‘prospective buyer’.

- The pictures uploaded on website pages should be of good quality, language used for product description must be simple and crisp.
- Feedback of the customers in form of ‘product review’ should also be there on e-commerce website, as the product review option increases the chances of a product purchase, nowadays customers prefer to buy a product after reading about its review.

3.3 ESSENTIAL TECHNOLOGY FEATURES REQUIRED

Essential features of technology required while designing e-Commerce are explained as follows:

- 1. Ubiquity:** E-commerce is ubiquitous i.e. it can be accessed from everywhere and at anytime. It is not restricted to any physical space and makes it possible to shop anytime, anywhere using any electronic device (laptop/desktop/mobile phone/tablet) having internet connectivity.
- 2. Global Reach:** The technology has eliminated the national boundaries. In e-commerce businesses, potential market size is almost equivalent to the global population.
- 3. Universal Standards:** Another obvious unusual feature of e-commerce technologies is there is one set of technical standards of the internet that is universal standards. The Internet is shared at the global level by all nations, it enables any computer to link with any other computer regardless of the technology platform used by each one of them. Using the universal standards files can be easily exchanged with any remote device across globe.

4. **Richness:** Advertising and branding are an important part of commerce. E-commerce can deliver video, audio, animation, billboards, signs and etc like traditional commerce. Information and the contents are rich can be delivered without sacrificing the reach.
5. **Interactivity:** E-commerce technologies allow for interactivity, meaning they enable two-way communication between the merchant and the consumer.
6. **Information Density:** Ecommerce technology reduces the information collection, storage, communication, and processing cost. At the same time, it has increased the accuracy of quality information, making information more useful and important than ever.
7. **Personalization:** E-commerce technology allows for personalization. On the basis of name, interests, and past purchase behavior products can be customized and personalized, further, this collected information could be used for sending marketing and promotional messages to the targeted customers.

3.4 DIFFERENCE BETWEEN APP BASED AND WEB-BASED BUSINESS

Businesses that generate their revenue directly from their website fall into the **web based business** category, these types of websites are typically informational in nature, they are made to provide the desired information typically a user demands whereas, a **mobile app** is a software application designed for use on mobile devices, such as smartphones and tablets, rather than desktop or laptop computers.

Nowadays, every individual has mobile phones, so almost everyone has switched from website to mobile application as it is convenient to use, can be carried everywhere and anytime. That is why most retailers are investing in e-Commerce app development to attract maximum customers to their online business (e-commerce).

Table 3.1: Difference between App based and web based business

Parameters	App based business	Web based business
Devices Used	Handheld devices such as Smart phones and tablets	Computers, Laptops
Internet Connectivity Requirement	Mandatory	Mandatory
Reachability	With push messages (notifications), app based business reach large number of customers, even when they are on the go	In web based business reach is limited.
Platform	Web store and native Apps (Play store in Android and App store in Apple)	Web stores

Technology Used in E-Commerce		
Payment Gateway	Mobile banking, net banking , Credit/Debit card, Wallets, COD.	Net banking, Credit/Debit card, Wallets, COD
Mobility	Mobility is high, as customers can buy and make transactions from anywhere, anytime as long as internet connectivity is there.	Mobility is low, as customers can buy and make transactions on their computers and laptops
Privacy and Security	There are lot many privacy and security issues related with app based business. Installation of malware on mobile is one of the major concern while shopping online using mobile app	Web based business is more secure than App based business

App-based business is the future of shopping as changing time requires changing solutions, and mobile app has proven it by providing customers the convenience and flexibility of shopping on the go.

3.5 BUILDING, DESIGNING AND LAUNCHING E-COMMERCE WEBSITE

Building an E-commerce website will strengthen the reputation of the business; it helps in the expansion of the brand nationally and internationally. The World Wide Web is all about the technologies that change the business environment and have an impact on the future of electronic commerce. The wide popularity of the internet in recent years has been fuelled largely by the prospect of performing business on-line, i.e. buying and selling of the product, services, or information via computer networks, mainly by the Internet. There are a lot many benefits of doing business through e-commerce that no company can afford to ignore. It is no longer an alternative but is chosen as the first choice for the new players in the market. Businesses are of various types, so the e-commerce model also changes accordingly. Even companies in the same industry, but different either with the size or customer base are finding that one same e-commerce models do not work. Therefore, one e-commerce model does not fit all.

3.6 SDLC CYCLE FOR DESIGNING E-COMMERCE SOLUTIONS

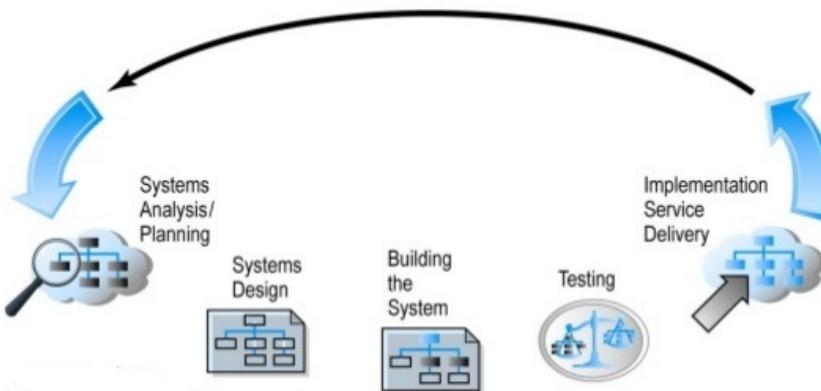
In the Systematic Approach of developing successful e-commerce two most important management challenges are involved, first challenge is to develop a clear understanding of the business objectives and the second challenge is to choose the right technologies to achieve identified business objectives.

Effective plan and knowledge base of the above factors will help in making sound management decisions that will help to generate consistent, optimum results in terms of increased growth of the online business (e-commerce)

For understanding the business objective Systems Development Life Cycle (SDLC) methodology is used, which helps in designing an appropriate solution. It includes the creation of documents that communicate to senior

management for achieving important milestones and the uses of resources. The five major steps of SDLC involved are:

- a. **System Analysis/ Planning:** In this phase objectives of website to be developed are identified and defined, system requirements are also gathered and on the basis of that System Requirement Specifications (SRS) document is prepared.
- b. **Systems Design:** In this phase the system model is designed like graphical user interface and database.
- c. **Building the System (Development):** In this phase the design is executed into actual e-commerce website.
- d. **Testing:** In this phase a thorough testing is done on actual e-commerce website of various parameters such as speed of website, connectivity between various pages, money transactions (if applicable).
- e. **Publish /Implementation:** A hosting company is chosen in this phase. Once it is finalised then payment for hosting charges are done, Hosting company provides a password that is used for uploading the website on the internet server.



Source*: <https://designsystemexamples.blogspot.com/2018/08/e-commerce-system-analysis-and-design.html>)

Fig 3.1: SDLC approach for E-Commerce website development

Nowadays, Agile method is becoming an integral part for the development of E-Commerce websites, apps and software, as it accounts for unpredictability by allowing for changes to be constantly implemented. In this method client is provided access to multiple versions (after iterations) of the website. Agile methods gained prominence from last one decade and in early personalized era, because agile method improves website quality by injecting client's feedback into a working website version.

Advantages of Agile Methodology: There are following advantages:

- a. **High Speed:** This method gives a much higher speed than conventional web development programs, due to its well-planned streamlining development.

- b. **Better product quality:** The website undergoes regular and rigorous quality checks to improve the quality, during the development process.
- c. **Flexibility:** It is difficult to work nowadays using different methodology (such as Waterfall etc)because of today's fast-on-the-move environment. Agile methodology works for projects with ever-changing requirements and goals, and adapts to any environment.
- d. **Regular and rigorous testing:** Quality checkups are done regularly till the final website is launched.

3.6.1 Hardware

Hardware is the basic technical requirement of an e-commerce website that can support e-commerce operations. Choosing the right kind of hardware for an e-commerce site is very important, for this consider the size, purpose, and traffic on the site to determine the use of server hardware. An E-commerce website is made up of HTML, PHP, Javascript, database, media files. The entire website is stored on a web server. Hardware for setting up a web server completely depends on the e-commerce website requirements. There are lot many that decide the hardware for hosting, such as what app you will be running on the web server. How many visitors you are expecting, what's the scalability of a site, etc.

3.6.2 Software

All e-commerce sites require basic Web server software to answer requests from customers for HTML and XML pages. It thus answers HTTP requests from customers. The choice of Web server software depends on the operating system. Apache, the leading Web server software; only works with UNIX operating system. Microsoft's Internet Information Server (IIS) is the second major Web server software.

3.6.3 Outsourcing Vs In-house Development of Application

In-house development of application is the process of developing and building an application on your own. It includes high risk; high skilled set and pre-built templates in this case.

Whereas, Outsourcing is hiring an outside vendor to provide develop the application that cannot be developed with in-house personnel.

This is completely different from in-house app development in terms of risk. It lowers down the risk of app failure because in this case, company hire the top app developers who are experienced and understand the market trends as well as customers/clients requirements.

Check Your Progress A

- 1) What is an App based business?

2) “Advancement of technology has impacted the business.” Comment.

3) What are the advantages of agile methodology?

4) What do you understand by in house development of an application?

3.7 ARCHITECTURAL FRAMEWORK AND NETWORK INFRASTRUCTURE

3.7.1 Architectural Framework of E Commerce

A framework is intended to define and create tools that integrate the information and allow the development of e-commerce applications. The aim of the architectural framework is on synthesizing the diverse resources already in place to facilitate the integration of data and software for better applications. The e-commerce architectural framework consists of following six layers of functionality, or services:

1. Applications Layer services: It includes all Customer to business, business to business and intra organizational services
2. Brokerage services, data or transaction management: It includes order processing, payment process and mail interactions
3. Interface and support layers: It facilitates Directory support functions, Interactive catalogues

4. Secure messaging, security and electronic document Interchange: It deals with encrypted e-mail, Electronic Data Interchange (EDI)
5. Middle ware and structured document interchange
6. Network infrastructure and basic communications services

All the above mentioned layers are connected and help in integrating information access and exchange within the context of the chosen application. As electronic commerce applications are based on several layers, when they are integrated, then provide uniquely powerful solutions.

3.7.2 Domain Name System (DNS)

The DNS is a system for mapping alphabetic names to numeric Internet Protocol (IP) addresses like a phone book maps a person's name to a phone number.

Lets understand the concept with an example, say 'www.abc.com' is an URL. In this 'abc.com' is the domain name and 'www' is the hostname. DNS resolution (the process of translating IP addresses to domain names) maps www.abc.com into an IP address (such as 192.0.2.1). When a user needs to load a webpage, a conversion must occur between what a user types into their web browser (www.abc.com) into an IP address required to locate the www.example.com site

3.7.3 Web Servers Implementation

The server and client speak the standardized, basically the computer language of the World Wide Web. Because of this standard language, The old Mozilla Netscape browser can still talk to a modern Apache or Nginx web server. The basic language of the Web with the request and response cycle from client to the server and then back to client remains the same as it was before. Modern browsers and web servers have simply developed and extended the language of the Web to incorporate new standards and to relate to the new customers.

Web server: A web server is server software, or hardware dedicated to run the software, that can satisfy client requests on the World Wide Web.

Client request: A client sends a request to a web server by using a browser such as Internet Explorer, Firefox, or Chrome. A Web server's work is to process requests from the clients. The result of the web server's processing is a response code and is commonly a content response.

The web server can be implemented in various ways. The following web server implementations each have changing features, extensions and configurations.

- **Apache HTTP Server:** It is the most usual deployed web server on the Internet for more than 20 years.
- **Nginx:** It is the second most commonly used web server, It can also be used as a reverse proxy, load balancer.

- **Caddy:** It is a new entry and it focuses on serving the HTTP/2 protocol with HTTPS.

The file sits on the file system in a location where the web server is authorized to access and the web server sends the file to the client with a status code. If the client had already requested the file and the file has not changed, the web server will pass back a 304 "Not modified" response indicating that the client already has the latest version of that file.

3.8 IMPACT OF EMERGING TECHNOLOGIES ON E-COMMERCE

In the preceding sections, we saw how Internet the “platforms of platforms” has tremendously reduced the entry costs of new businesses / entrepreneurs in the market.

Now we would move on understanding the impact of emerging technologies on businesses.

Emerging technologies are simply new technologies that are currently developing or will be developed over the next five to ten years, and which will substantially alter the business and social environment. Broadly, emerging technologies can be understood as ‘science-based innovations with the potential to create a new industry or transform an existing one’, which will “substantially alter the business and social environment”

There is no established definition of Emerging technology. The term Emerging technology is interchangeably used with Disruptive Technologies. These Emerging technologies are broadly divided into three categories *viz* ‘Artificial Intelligence-AI’, ‘Transparently Immersive Technologies’ and ‘Emerging Digital Platforms’. Emerging technologies such as Internet of Things (IoT), Artificial Intelligence (AI), Robotics, have influenced every sector.

The accelerating pace of adoption of Emerging technologies in e-commerce is going to be impressive, because of dramatic reductions in operating costs, easier access to the consumer as well as because of innovations possible in the design and delivery of products and services due to these newer forms of digital technologies.

Emerging technologies are also often referred to as ‘Disruptive’ – the one that displaces an established technology and shakes up the industry and could be termed as a ground-breaking product capable of creating a completely new industry. In the next few subsections, we shall discover the tremendous impact of Emerging technologies on businesses and that how these technologies have revolutionized the existing e-commerce business models.

Presented herewith are discussions on impact of only a select few Emerging technologies *viz* Mobile Devices and Mobility, Big Data and Big Data Analytics, AI/ML, IoT /IoE/IoT/ Digital Twins, Cloud/ Edge/ Fog computing, and convergence of these technologies as Industrial Revolution 4.0, on the realm of e-commerce.

- 1) **Mobile Devices and Mobility and its Impact on e-Commerce:** In present busy lifestyle, every consumer wishes to get services on the go. These services could be as routine as payment of utility bills to ordering of food or apparels or even buying and investing in fixed / movable assets using smartphones and other handheld devices. No one could ignore the significance of mobile devices and the advantage of mobility these devices present in our daily lives.

Growing penetration and popular acceptance of mobile devices has led to the increase, and growth of ever evolving mobile based solutions. It has also revolutionized the way online shopping had been conducted earlier. E-commerce companies are now striving hard towards offering unsurpassed User Interfaces (UI) and User Experience (UX) to their target consumers on their handheld digital devices. Mobility is indeed, becoming a highly significant aspect of e-commerce design considerations.

- 2) **Big Data and Big Data Analytics and its Impact on e-Commerce:** E-Commerce is a sector, in which companies handle a large amount of data on their databases. Data about customers, distributors, retailers, products, processes, prices, logistics, and several other aspects of businesses is growing faster than ever before. In such situation use of Big Data and Big Data analytics become relevant to save, update, use, process and share this ever-growing business details.

The term Big Data is largely characterized by the mix of the 4 V's—volume, velocity, variety, and veracity. Big Data technologies not just process the huge quantity and range of data formats but also lend speed to its processing. Every second, more and more data is being created from heterogeneous components of e-commerce which also needs to be analyzed in an integrated manner in order to extract maximum value out of it.

Big data analytics is a collection of different types of tools, including those based on predictive analytics, data mining, statistics, artificial intelligence, etc. . The complex analysis of Big Data is enabled by the science of big data analytics coupled with intelligent and predictive processing enabled by AI / ML algorithms.

Big data analytics is the process of examining large and varied data sets *i.e.*, big data to uncover hidden patterns, unknown correlations, market trends; customer preferences and other useful information that can help organizations make more-informed business decisions. Powered by AI/ML, big data analytics help organizations to make better business decisions and forecast future trends.

- 3) **Artificial Intelligence (AI), Artificial General Intelligence (AGI) and Machine Learning (ML) and its Impact on e-Commerce:** Artificial Intelligence (AI) is an important Emerging technology, that has created impact on everything that we do today – right from searching the Internet, to watching series/movies on streaming platforms to what we order online.

Artificial Intelligence is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning, reasoning, and self-correction.

More typically, Artificial General intelligence (AGI) is the representation of generalized human cognitive abilities in software so that, faced with an unfamiliar task, the AI system could find a solution. An AGI system could perform any task that a human is capable of. Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.

Machine learning focuses on the development of computer programs that can access data and use it to learn for themselves. Artificial Intelligence (AI) with its core subset of Machine Learning (ML) is rapidly transforming life experiences— ranging from routine mundane chores to critical decision-making. AI/ ML permit rule-based extractions on heterogeneous multidisciplinary data collected over the entire value chain of businesses.

Artificial Intelligence is helping e-commerce businesses get closer to their customers, as with the help of AI e-commerce platforms are able to utilize large datasets regarding customers purchasing behaviour and product search patterns. Artificial intelligence self-learning algorithms can create personalized shopping experiences for online buyers.

Typically, businesses are implementing AI/ML to increase retail standards, customer experience, and profits and fast processing. Following are some facilities that AI is providing to e-commerce:

- **Personalization:** The clients are provided with a personalized experiences and easy to select products/searches based on their earlier searches (machine learning technique).
- **Real-time intent targeting:** It is the next step in personalization. Enabled by AI, it gives the ability to accurately predict ever-changing customer intent.
- **Voice Assistant:** AI is also facilitating voice assistants, by which customers can interact with and resolve their queries.
- **Recommendation engines:** A recommendation engine is a tool that filters the data by using algorithms and suggests popular products for customers. Based on the customers past purchasing behaviour, these engines will suggest items which the customer may probably purchase.
- **Chat box support:** It is a computer program that allows conversational performances, engaging purchasing more highly by text and voice. Nowadays, it is popularly used in mobile phone,

internet browsers, or internet chat rooms. A basic and simple real-time human-like interaction using both text options can also enhance user experiences (UX) and thus nurture good engagement between the customer and the online store.

- 4) **Internet of Things (IoT), Industrial Internet of Things (IIoT), Digital Twins and its Impact on E-Commerce:** The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interventions

IoT devices keep capturing, sharing, collating, millions of zetta bytes (10^{21} bytes), which is made available to planners/decision makers for real-time decision making through state-of-art control centres.

Industrial Internet of Things (IIoT) is similar interconnected network particularly in industrial context, where all the instruments have sensors and are interconnected with each other.

Extending the concept of IIoT, is the concept of ‘digital twin’- which refers to the digital process of creating a virtual representation of a product. The application of ‘digital twin’ can be used in product design, simulation, monitoring, optimization, and servicing and is an important concept of Industrial Internet of Things (IIoT)

The impact that IoT and its related technologies have on e-commerce is interesting. For example, IoT sensors and RFID (Radio Frequency Identification) tags have transformed the way inventory is organized at the backend of online stores.

Warehouse automation: Most of the organizations are presently concentrating on handling their warehouse operations for decreasing costs and increasing business efficiency. Automated warehouses are progressively effective, adaptable, quick and trustworthy as well. They help online shopping companies to adapt and handle the distribution of warehouse products.

Because of interconnected sensors on the products, a unique online shopping experience is possible, where both the buyers and sellers can ‘view’ and monitor the availability and movement of inventory in real time. Such IoT based implementations in the back-end factories lead to better ‘supply chain management’ models. Tracking the status of the product has never been so accurate before the advent of IoT technology. With the help of IoT sensors and RFID tags, customers can easily know what happens to the product they have ordered, where it is, what the arrival time of the product etc is.

- 5) **Cloud Computing, Edge Computing and Fog Computing and its Impact on e-Commerce:** With the increase in storage capabilities and

methods of data collection, huge amounts of data must be stored and managed well in remote data centres, called as ‘cloud’.

Cloud assures to deliver on-demand computing resources and services in three basic manner *viz.* Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS).

Cloud computing term is often referred to refer to the process of analysing the data lying in these remote data centres. A close variation of the concept of ‘cloud computing’ is ‘edge computing’.

‘Edge Computing’ moves computing applications, data, and services away from centralized nodes to the logical extremes of a network. It enables analytics and data gathering to occur at the source of the data, instead of remote data centres.

‘Fog computing’ refers to a collection of co-located edge-computing devices and computations, connected over Internet. Therefore, fog computing is a decentralized computing infrastructure in which data, compute, storage, and applications are located somewhere between the edge and the cloud. Edge and fog computing help to process co-located data closer to where it has been captured from, rather than waiting for it to ‘flow’ to the remote cloud servers. Fog computing and Edge computing, therefore, reduce the time-gap between data capture, data-processing and data-dissemination.

All these varied possibilities of computing offered by Cloud, Edge and Fog allow business enterprises to launch applications without worrying about the infrastructure. These remote implementations help businesses to have access the information stored in big data storages without delays.

Cloud based e-commerce solutions are cost effective, scalable and could be considered as the best option available to those enterprises who need to access terabytes of e-commerce data, without the botheration of maintaining it on the local premises.

Another important benefit of cloud computing is that it provides security to the data by storing it in a virtual space. Physical servers or on-premises data centres cannot easily combat the risks of disasters/risks which could occur anytime.

Cloud computing, along with its emerging trends like fog computing and edge computing can be utilised in e-commerce realm to provide alternative contact points for the related business processes and to its numerous users.

6. **Block Chain Impact on E-Commerce:** A block chain is a digital record (distributed ledger), which is made to store a list of transactions (called ‘blocks’). Each block has a different feature which contains a link to the previous block, a timestamp, and data about the transactions it represents. Blocks cannot be modified once they are created. Since nobody can modify a block after it's been created, all parties (buyer and

seller) can be assured that the data it contains is still valid long and remains unchanged after its creation.

Block-chain technology is a natural fit for E-Commerce since it was designed for storing transactional data. However, this data doesn't need to be financial; it can be any distinct action that requires a fixed record, including actions related to payment and order fulfilment.

There are various advantages (plus points) of block chain technology that make it an approachable technology for the e-commerce industry (and other industries) in the coming future. Some of the plus points are discussed below:

Transparency: One of the major reasons block-chain is interesting businesses is that this technology is almost always open source. That means other users or developers will have the opportunity to modify it as they prefer it to be.

Stability: Confirmed blocks are very unlikely to be reversed, meaning that once data has been registered into the block chain, it is extremely difficult to remove or change it. This makes block chain a great technology for storing financial records.

Reduced transaction costs: Blockchain lets peer-to-peer as well as business-to-business transactions to let them complete without the requirement of a third party, which is usually a ‘Bank’. Because there is no Inclusion of a middleman which is tied to block chain transactions, which basically means that they can actually reduce costs to the user or businesses over time.

Decentralization: Another important reason the block-chain is so exciting is because of its lack of a central data hub. Instead of running a massive data centre and verifying transactions through that hub, block-chain actually lets the individual transactions to able to have their own copy of proof of validity and the authorization to be able to enforce those constraints.

User-controlled networks: Finally, crypto currency investors are inclined to be really motivated by the control aspect of the block-chain. Rather than having the third party performs its tasks, users and developers should be the ones who get to call the shots.

From the above discussions, block chain will be the driving force for e-commerce in the future, as indicated herewith:

- a. **Better Supply Chain Tracking & Monitoring:** Supply chain tracking and monitoring is the most crucial aspect of e-commerce. The well-monitored and balanced supply chain is a distant dream for e-Commerce businesses. Tracking the products, managing the stock is very hard for e-commerce. Blockchain implementation in this area will likely solve many problems, this technology could be extensively leveraged to solve supply chain issues like recordkeeping, tracking of products etc.

- b. **Provenance Tracking:** The record keeping and provenance tracking becomes easy in a block chain enabled supply chain, as the product information can be accessed with the help of RFID tags and embedded sensors. Tracking could be done from product's inception stage to it's present status.
 - c. **Payments Get an Efficient Makeover:** The payment industry is obtaining ample benefits from block chain technology. Crypto currency has gained the necessary power and is being used as an alternative to the traditional currency in e-commerce. Nowadays, customers prefer crypto currency because it doesn't expose personally identifiable information such as name, credit/debit card number, etc.
 - d. **Secure Platform for e-Commerce:** Security in any form is a cause of concern for e-Commerce businesses. The Blockchain-based e-Commerce platform offers security at all levels including data and wallet security.
7. **Industrial Revolution 4.0 and its Impact on E-Commerce:** These 'smart' digital technologies including AI, IoT, Cloud computing, Big Data Analytics etc. have also led to a paradigm shift in businesses, particularly the manufacturing sector, ushering in, what is popularly referred as 'Industry Revolution 4.0' (IR4.0). Industry 4.0 completely relies on real time data exchange and digital interconnectivity enabled by cyber-physical systems (CPS) and emerging technologies. In IR 4.0, the physical world of manufacturing relates to digital world using cyber-physical systems (CPS), internet of things (IoT), and industrial internet of things (IIOT), cloud computing, and artificial intelligence for better collaboration across departments, partners, vendors, product, and people. IR 4.0 has now been accepted as a more comprehensive, interlinked, and holistic approach to manufacturing than the prevailing one. The underlying concept of IR 4.0 is "interconnectivity using emerging technologies".

3.9 DIGITAL PLATFORMS AND E-COMMERCE

As is evident from the previous section, the impact of Emerging technologies on e-commerce has been enormous in the last few years. Convergence of Emerging technologies has led to the emergence of newer cloud-based 'digital platforms', which are more complex in implementation than online stores that we had been talking so far about. Even the implementation strategies and revenue models are different than the basic e-commerce business models we had studied. Let us try to explore the concept of Digital platforms, also referred as only 'Platforms'.

What are Digital Platforms : Digital platforms can be understood as digital "frameworks of complex web portals and online digital facilities that permit collaborators – users, peers, providers -- to undertake a range of activities, often creating de facto standards, forming entire ecosystems for value creation and capture.”.

Digital platform is essentially a cloud based implementation; it employs AI/ML to personalise and contextualise each activity undertaken by the visitor to the platform; it relies on Big Data technologies to store varied, real time data and uses APIs to ‘converse’ with this huge , heterogenous Big Data.

How Platforms Work: All the past choices and transactions undertaken by the customer are stored in enormous databases running in the cloud. ML algorithms are employed on these huge databases to ‘data-mine’ and ‘guess’ the future choices of the customer. These ‘predicted choices’ are presented using customised APIs, when he/she logs in again. As already explained in the last Unit, APIs – application programming interfaces, deliver a customer’s response to the system and sends the system’s response back to the customer. Therefore, cloud, huge databases, AI/ML and APIs work together in the platforms to predict future choices of the customer that help to ‘target’ them in a more personalised manner. These predictions are not just about the ‘potential product / service choices’ of the customers but are also used for displaying targeted advertisements and campaigns that the customer could be potentially interested in.

Though all the e-commerce online stores use Internet itself as the foundation of designing and launching platforms but in present times, several technology companies (also referred in spoken language as ‘BigTech giants’) are emerging as infrastructure companies who provide Cloud infrastructure and the related AI/ML based tools to the rest of the companies for constructing their own company portals and delivering services/ products. For example, Amazon Web Services (AWS) provides digital infrastructure and tools with which other platforms are built. Similarly, Google Cloud Platform (GCP) which is also emerging as one of the fastest and enormously growing cloud-computing platforms in the market. IBM Cloud and Alibaba cloud are other two interesting players in the field of providing “ Platform for Platforms”.

Types of Platforms: Depending on the services offered, various researchers have categorised digital platforms in various types, such as

- Sharing Economy Platforms
- Development Platforms
- Crowd-Sourcing /Crowd-Funding platforms
- Payment Platforms
- Retail Platforms
- Booking Aggregators
- Content and Review Platforms
- Matching and Social Media Platforms
- Communication Platforms
- Search Platforms.



Source*: https://www.researchgate.net/publication/331907029_Platforms_in_the_Peer-to-Peer_Sharing_Economy/figures?lo=1

Fig 3.2: Types of Digital Platforms

Impact of Digital Platforms on e-Commerce: Understandably, the development and application of the platform economy has a deep impact on the way business transactions could be undertaken in future.

- The first main advantage of digital platform has been that it has initiated *disintermediation* – i.e. removal of local brokers (middlemen) from the supply chain. Using advance tools and algorithms, digital platforms, also referred as third-party marketplace or aggregators, connect sellers (for example, wholesale companies) with buyers (for example, consumers) by removing intermediaries (for example retailers) from the supply - chain. For example, *Uber* directly connects drivers with riders using basic algorithms, thereby eliminating ‘Taxi stands’ from the supply chain of automobile services. In the same vein, *Kickstarter* or *Indiegogo* for project funding have replaced traditional intermediaries.
- Platform economy has also led to the popularising of the word ‘*uberisation*’ which refer to the concept of buyers and sellers, consumers and producers coming together virtually on the ‘digital platform’. For example, digital platforms (such as *Upwork*) now help to facilitate HR (human resource) functions.
- Several products / services that had a huge time and cost premium attached to it are now easily available on these platforms. For example, a library of software tools for building other software utilities is available on *Github*. Similarly, there is *App Store* of Apple and Google *Play Store* for Android that provide trusted platforms to facilitate the users to

download other apps by providing inbuilt safeguard mechanisms for privacy, security and trustworthiness of content for the users.

In short, powered by Cloud, AI/ML, Big Data and related Emerging technologies, digital platforms connect all stakeholders of value chain who are involved in a business transaction and help in convergence of processes , places and people involved. They help local products and services to have a global outreach. Platforms, therefore, have a very strong multi-dimensional characteristic that would impact e-commerce business models of future.

3.10 DIGITALISATION AND DIGITAL TRANSFORMATION IN BUSINESSES

Even the e-commerce designers are reimagining how goods and services could be delivered more creatively by employing Emerging technologies. These trends towards extensive dependence on Emerging technologies made possible through mobile devices and apps, have also led to automation of internal processes of businesses (such as inventory management, HR automation and so on) as well as of customer-facing processes (such as billing, notifications to the customers and so on). This, in return has led to extensive business process reengineering and process automation of internal and external business processes using various Emerging technologies including AI/ML etc. Integrated automation of end-to-end processes of business enterprises using Emerging technologies is also called *digitilisation*(and not digitisation) or *digital transformation in enterprises*.

Digitilisation transforms delivery of services or businesses, by replacing earlier technology implementations and manual processes with redesigned digital processes that use Emerging technologies.

Undoubtedly, Emerging technologies have ushered Digital transformation in the area of trade and commerce. Businesses have become cloud-based and mobile-enabled. Enterprises have become more agile and ‘virtual’ in nature. Newer business models have emerged that are more ‘intelligent’ and responsive to the needs of their customers and customers, have, truly become the ‘kings’ and ‘queens’ getting products/ services – whichever they need and wherever they need.

Check Your Progress B

- 1) State the impact of Industrial Revolution 4.0 on e-Commerce.

.....
.....
.....
.....
.....

- 2) What are the various types of platform business models?

.....
.....
.....
.....
.....

- 3) State the impact of Digital Platforms on e-Commerce?

.....
.....
.....
.....
.....

- 4) “Trends towards extensive dependence on Emerging technologies made possible through mobile devices and apps.” Comment.

.....
.....
.....
.....
.....

3.11 LET US SUM UP

In the last decade, the way of doing business has totally revolutionized. The advancement in technologies impacted the e-commerce industry drastically; it has transformed the way consumers connect with brands. Now the customers feel more empowered as they can buy anything just with a click of a mouse, can shop more cost-effectively, track orders, find the best deal by comparing different portals and get the convenience of getting products delivered to their doorstep.

None of the e-commerce applications would be possible without some basic design considerations. The basic design considerations, which, when set up right, will pave the way to a prosperous online business. Five important design considerations of e-commerce are design of e-commerce website, easy navigation, simple checkout, logistics and good product pages. Various Essential features of technology required while designing e-Commerce respectively are ubiquity, global reach, universal standards, richness, interactivity, information density, personalization.

Businesses that generate their revenue directly from their website fall into the web based business category, these types of websites are typically informational in nature, they are made to provide the desired information typically a user demands whereas, A mobile app is a software application

designed for use on mobile devices, such as smartphones and tablets, rather than desktop or laptop computers.

Building an E-commerce website will strengthen the reputation of the business; it helps in the expansion of the brand nationally and internationally. The World Wide Web is all about the technologies that change the business environment and have an impact on the future of electronic commerce. The wide popularity of the internet in recent years has been fuelled largely by the prospect of performing business on-line, i.e. buying and selling of the product, services, or information via computer networks, mainly by the Internet.

For understanding the business objective Systems Development Life Cycle (SDLC) methodology is used, which helps in designing an appropriate solution. It includes the creation of documents that communicate to senior management for achieving important milestones and the uses of resources. The five major steps of SDLC involved are System Analysis/ Planning, Systems Design, Building the System (Development), Testing, Publish /Implementation.

A framework is intended to define and create tools that integrate the information and allow the development of e-commerce applications. The aim of the architectural framework is on synthesizing the diverse resources already in place to facilitate the integration of data and software for better applications. The DNS is a system for mapping alphabetic names to numeric Internet Protocol (IP) addresses like a phone book maps a person's name to a phone number.

Emerging technologies are simply new technologies that are currently developing or will be developed over the next five to ten years, and which will substantially alter the business and social environment. Broadly, emerging technologies can be understood as ‘science-based innovations with the potential to create a new industry or transform an existing one’, which will “substantially alter the business and social environment”. Technologies are widely used in e-commerce domain. E-commerce is booming in an unprecedented way with implementation of frontier technologies. For instance, Cloud based/Fog based systems are helping businesses to have access the information stored in big data storages without delays, it’s cost effective, offers scalability and is the best option available to the larger organizations and companies who need to hold terabytes of e-commerce data.

The impact of Emerging technologies on e-commerce has been enormous in the last few years. Convergence of Emerging technologies has led to the emergence of newer cloud-based ‘digital platforms’, which are more complex in implementation than online stores that we had been talking so far about. Undoubtedly, Emerging technologies have ushered Digital transformation in the area of trade and commerce. Businesses have become cloud-based and mobile-enabled. Enterprises have become more agile and ‘virtual’ in nature.

3.12 KEYWORDS

Blockchain: A block chain is a digital record (distributed ledger), which is made to store a list of transactions (called ‘blocks’). Each block has different feature which contains a link to the previous block, a timestamp, and data about the transactions it represents.

Brand awareness and image building model: Web sites that are using this model provide detailed and rational information about the firm and its offerings. The model reaches the motivated and desperate customers with an information/image-rich communications message.

Chat box: It is a computer program that allows conversational performances, engaging purchasing more highly by text and voice. It is popularly used in mobile phone, internet browsers, or internet chat rooms.

Community model: The existence of the community model is based on user loyalty. The community model may also run on a subscription fee for premium services.

Customisation model: This model provides customers with content that is customised to meet their preferences by completely customising information needs. A website built on this model can be highly attractive to visitors.

Industrial Internet of Things (IIoT): Industrial Internet of Things (IIoT) is similar interconnected network particularly in industrial context, where all the instruments have sensors and are interconnected with each other.

Info-me-diary Model: The term ‘Info-me-diary’ is a composite of information and intermediary. This website model aggregates information from multiple electronic commerce retailers and provide services of searching and comparison for Internet customers.

Interactivity: E-commerce technologies allow for interactivity, meaning it enable two-way communication between the merchant and the consumer.

Manufacturer model: This model is based on the power of the Web to allow manufacturers to reach buyers directly and thereby compress the distribution channel.

Personalization- E-commerce technology allows for personalization. On the basis of name, interests and past purchase behaviour products can be customized and personalized, further this collected information could be used for sending marketing and promotional messages to the targeted customers.

Recommendation Engines: A recommendation engine is a tool that filters the data by using algorithms and suggesting popular products for customers. Based on the customers past purchasing behaviour, these engines will suggest items which the customer may probably purchase.

Ubiquity: Ubiquity in E-commerce means that it can be everywhere, whereas, the traditional business market is a physical place.

Web Server: A web server is server software, or hardware dedicated to running the software, that can satisfy client requests on the World Wide Web.

Technology Used in
E-Commerce

3.13 TERMINAL QUESTIONS

1. What are various important design considerations of E-commerce?
2. Explain various features of technology required while designing E-Commerce.
3. What do you understand by App based business? State the differences between app based and web based business.
4. Discuss the five major steps of SDLC life cycle for designing E-commerce solution.
5. State the impact of various emerging technologies such as mobility, cloud, AI and IoT on E-commerce.
6. What are the facilities that Artificial Intelligence is providing to E-commerce?
7. What are digital platforms? How do they work? State various types of platform business models.
8. Write a short note on followings:
 1. Architectural Framework of E-Commerce
 2. Web Server Implementation
 3. Domain Name System
 4. Digital Transformation in Business



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 4 E-GOVERNANCE

- 4.0 Objectives
- 4.1 Introduction
- 4.2 Meaning of E-Governance
- 4.3 Differences between E-Government and E-Governance
- 4.4 Differences between E-Governance and E-Commerce
- 4.5 Advantages of Employing Digital Technologies in Governance
- 4.6 Gartner's Evolution Model of E-Governance
- 4.7 E-Governance in India
 - 4.7.1 From 1970s to 1990s - Establishment of IT based Organisations
 - 4.7.2 Growth of E-governance in India from 1990s to till now
- 4.8 Digital India
 - 4.8.1 Nine pillars of Digital India:
 - 4.8.2 Key Initiatives of Digital India
- 4.9 E-Governance initiatives in India
 - 4.9.1 e-NAM
 - 4.9.2 FMS
 - 4.9.3 Soil Health Card
 - 4.9.4 GeM
 - 4.9.5 DigiLocker
 - 4.9.6 PMGDisha
 - 4.9.7 e-Granthalya
 - 4.9.8 UMANG
 - 4.9.9 TDIL
 - 4.9.10 NKN
- 4.10 Let Us Sum Up
- 4.11 Keywords
- 4.12 Terminal Questions

4.0 OBJECTIVES

After studying this unit, you should be able to:

- understand the fundamentals of e-government and e-governance;
- differentiate between e-government, e-governance and e-commerce;
- appreciate the advantages of employing digital technologies in governance;
- trace the evolution of application of digital technologies in governance by applying Gartner's evolution model of e-governance;

- list the chronological growth of application of digital technologies in governance; and
- appreciate some of the latest digital initiatives by Government of India.

4.1 INTRODUCTION

The introduction of new information and communication technologies (also called digital technologies) and changing demographics and political requirements are trying to redefine the role of governments and public sector organizations. To better serve the citizens by fulfilling their requirements that they represent, governments and the public sector in general, are looking for more competent and effective ways to respond to newer challenges of public service delivery and governance. The global shifts towards increased positioning of information communication technologies by the government and related public agencies became most visible in early 1990s, especially with the arrival of user-friendly World Wide Web (www) of Internet. This led to the popularity of the terms ‘e-government’ and subsequently ‘e-governance’.

4.2 MEANING OF E-GOVERNANCE

The term ‘e-Government’ (for electronic government) could formally be defined as “the use of information and communication technologies including Internet, as a tool to be a better government”. For example, applying online for public service such as applying for a passport / *rashan* card / railway ticket (or) payment of public utilities using its website/ respective app, digital payment of public utilities such as water and electricity. E-Government also encompasses the automation of processes in the public sector in general, for example, creation and implementation of digital identity cards that speed up citizens’ identification processes.

All these public services are made available to the citizens by creating a dedicated website as well as a mobile app and could be accessed by citizens using their own digital devices, desktop, laptop, mobile phones and / or using established public kiosks including Common Service Centres (CSCs).

There is another similar word, ‘e-governance’. E-Governance is a bigger concept than e-government. It refers to the digital means of giving power to democracy and supporting development. It is not merely about application of digital technologies to the functioning of government, but it is also about implementation of electronic/digital means the way citizens relate to governments and to each other.

It is important to mention to the reader here that despite this fine conceptual difference between both the terms, ‘e-government’ and ‘e-governance’, majority of the generic references to both the terms has been found to be interchangeable. However, in this unit, we would differentiate this clearly in our next section.

4.3 DIFFERENCES BETWEEN E-GOVERNMENT AND E-GOVERNANCE

As already suggested in the previous section, the terms ‘e-governance’ and ‘e-government’ are used interchangeably, but e-governance has a greater scope and connotation than e-government. e-Government mainly refers to the automation of services managed by the government, and delivery of public services and administrative information to the citizens using information and communication technologies (ICTs) including computers, mobile phones, information kiosks, Internet, community radio, digital TVs etc. Examples of e-government include online availability and submission of application forms for various public services such as grievance redressal, passports, ration cards, as well as facilitating electronic utility payments and access to land records.

e-Governance, on the other hand, enables new ways of involving citizens and communities in online debates on issues of public concern. Online polling, digital democracy and e-participation are some other applications of e-governance. Therefore, e-governance, refers to all the digital possibilities of engaging, enabling and empowering the citizens so that ‘good governance’ is achieved. It is an exercise to better and efficiently manage affairs of a country at all levels, with equal emphasis on citizen inclusion.

It is because of these sharp differences (Table-4.1) that the word ‘e-governance’ is considered as a bigger concept than ‘e-government’.

Table 4.1: Differences between e-Government and e-Governance

Key Points	e-Government	e-Governance
Objectives	1. e-Government focuses on improving and accelerating administrative efficiency.	1. e-Governance focus on to increase citizens' interactions within themselves, as well as with government agencies.
Benefits	2. Improving service delivery 3. Increasing Operational Efficiencies by reducing consumer time, efforts and costs. 4. Increasing Outreach of public services	2. Increasing modes of Citizens' Participation. 3. Improving Public Policy Formulation 4. Redefining Democracy and Communities with citizens' participation.

4.4 DIFFERENCES BETWEEN E-COMMERCE AND E-GOVERNANCE

The term ‘e-commerce’ denotes the process of buying and selling of products, services, or other commodities using information and communication technologies (ICTs)/ digital technologies. The prime

purpose of implementing e-commerce is to ensure ease of conducting and delivery businesses – making any commercial product / services available to the consumers at their doorsteps and for maximising commercial gains. On the other hand, ‘e-government’ and ‘e-governance’ are primarily focussing on application of ICTs for better public service delivery and for ensuring wider participation of citizens in public affairs. The purpose of implementing digital technologies in public domain is to improve governance processes so that public service delivery is easy, inclusive and responsive and governance becomes transparent and participatory. The motivation, objectives and deliverables etc are very different in both the instances. (Table 4.2).

Table 4.2: Differences between e-Commerce and e-Governance

Elements of Comparison	E-Commerce	E-Governance
Motivation	Make profit	Maximise social utility, create e-participation
	Cost reduction of service delivery	Cost reduction of service delivery
	Automation of internal processes	Automation of internal processes
Objectives	Sale of products and services	Optimisation of services quality to citizens
	Information provision	Information provision
	Online Customer service	Online service to citizens
Priority	Safe & secure transactions	Minimise digital divide
Technology	Internet, Web Based platforms, Back Office Systems	Internet, Web based platforms, back office systems
Decision Making Authority	Centralised	Dispersion of authority
Target Group	customers, potential customers	Any Citizen
Legislation	Freedom	Laws and regulation restrictions and complexity
Services	Primarily transactional	Primarily informational

Source: https://www.researchgate.net/figure/Similarities-and-differences-between-e-commerce-and-e-government_tbl2_265140668

4.5 ADVANTAGES OF EMPLOYING DIGITAL TECHNOLOGIES IN GOVERNANCE

By now, we have already understood that there are several advantages of implementing digital technologies in governance, e-government, and e-governance. World over, countries are embracing digital technologies to increase the efficiency of their internal processes, to deliver better and more integrated services to citizens and businesses, invite citizen and stakeholder participation in planning decisions, improve communication, and sometimes even enhance democratic processes and so on.

Some of the advantages of employing digital technologies in governance are summarised herewith: -

- 1. Fast and convenient service to citizens:** Citizens can have easy and quick access to the related information regarding to all the public services by applying for any service online on web portal/ apps developed by the government. Further he/she can get documents easily in electronic form or hard copy as per the requirement, so there is no more waiting in the long queues. In other words, citizens can take advantage of many other online services just on a click of mouse and the public services are available to them at their doorsteps by minimising their transaction costs and travelling costs.
- 2. Reduction in delays, red tapism, and corruption:** Implementation of e-government and e-governance lowers several other related bureaucratic problems such as long processes, personal grudges of the delivery officers and so on. With implementation of digital technologies, there is improvement in transparency in public processes and clear accountability of the government functionary in charge of that process. It not just fastens the processes but also reduces corruption that could come up in manual processes.
- 3. Effective utilization of resources:** Resource utilization is optimised through effective implementation of digital technologies in public domain due to the speed and efficiency provided by digital technologies. This kind of utilization is not possible with manual paperwork and manual processes, otherwise used in government organisations.
- 4. Enhanced citizen participation:** In a democratic system, citizen participation is one of the key components of decision-making process. The use of Internet based technologies raises the possibility for large-scale citizen participation in policy making process of government, despite the distances and diversity of the population.
- 5. Integration of public services offered by different departments:** By using digital technologies, different departments and different functions could be connected. This integration of public services offered by state and central government provides ease of access of public services to the citizens.

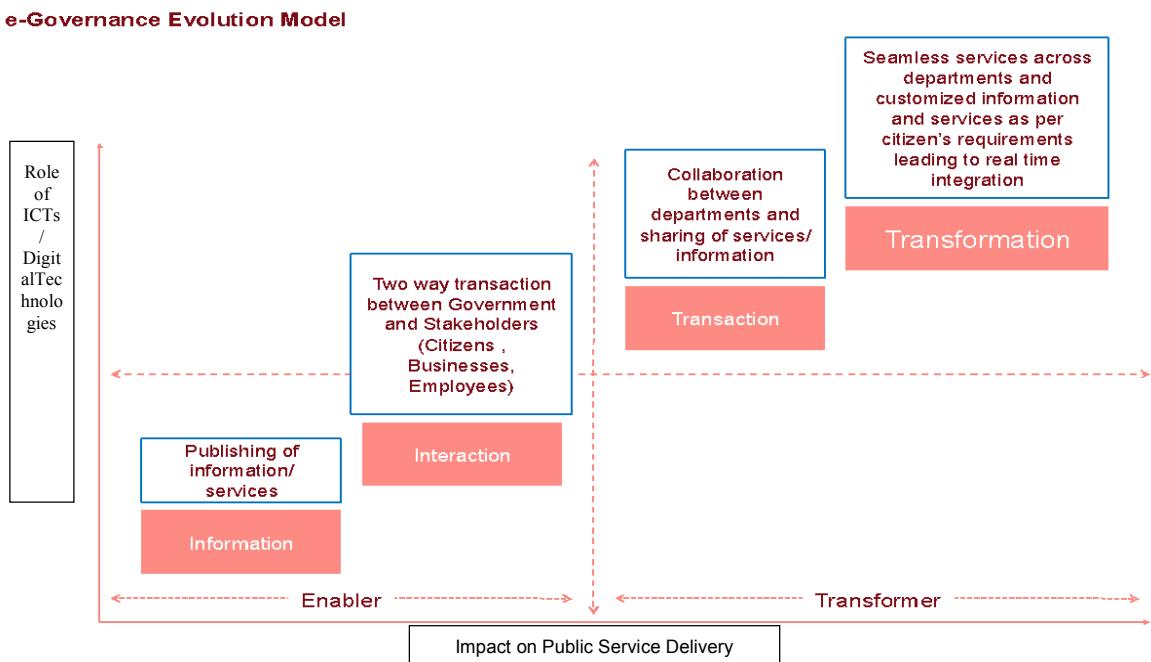
Indeed, the growth of e-governance and e-government has been one of the most striking and noticeable developments in governance and it would be interesting to understand how different public organisations or even a country evolves from the most basic stage of employing digital technologies in governance to the higher stages. This is explained in the next section by referring to the Gartner's evolution model of e-government.

4.6 GARTNER'S EVOLUTION MODEL OF E-GOVERNANCE

In the year 2000, the Gartner Group Inc presented a conceptual framework to measure the progression of e-government in an organisation in four

critical phases of e-government evolution, viz., information, interactions, transaction and transformation (Figure -4.1).

E-Governance



Source: <https://www.gartner.com/en/doc/3713917-the-gartner-business-value-model-a-framework-for-measuring-business-performance>

Fig 4.1: Gartner's Model on Evolution of e-Government and e-Governance

- **First Phase- Information:** In the first ‘Information’ phase of governance, information pertaining to various aspects of public service delivery are made available to the public through use of websites, portals etc to all the stakeholders, that is, citizens, businesses and government. This information being reflected on the government website could also be related to the functioning of various government entities, roles and responsibilities, thus making government more transparent and also resulting in convenience to citizens and businesses. This phase has been attained by almost all government entities in our country.
- **Second Phase – Interaction:** In the second phase of ‘Interaction’ there could either be a limited one-way engagement between government (agencies) and citizens or there could also be a vibrant and dynamic two-way exchange between the government (agencies) and the citizens using digital interfaces including a website or mobile app.. As an example of one-way exchange, citizens and the government agencies can exchange emails, download all sorts of forms and applications using a website / app, upload and submit forms using this interface, which work essentially on ‘anywhere, anytime’ basis, consequently saving stakeholders’ time and making life easy. In the second variation (two-way exchange), the citizens could engage in dynamic dialogues with the respective government agency, using the digital interfaces, to know about the status of the reserved ticket, seat in a particular train etc. Therefore, in this phase, a significant part of government processes is done online but the citizens still must visit the relevant government offices for the balance processes may be - payment of fees or

submission of support documents, required to complete the rest of the transaction(s).

- **Third Phase - Transaction:** Any transaction constituting public service delivery where money is involved, becomes a complex process. In the third phase of ‘Transaction’, the financial part could also be undertaken online without the need of a physical visit to the respective government agency. Examples of such transactions are paying utility bills online, all online banking and financial transactions, filing of income or property tax, visa/passport related online services, extension/renewal of licenses and so on.
- **Fourth Phase – Transformation:** In the last phase of Gartner’s model, referred as ‘Transformation’, all the related back-end sections of the entire government department are digitally interconnected so that one virtual counter is available on the website / app to the citizens and businesses to avail all public services. This end-to-end digitilisation of public service delivery requires complete change in the current way of functioning of the various government departments and it also insists liberal use of emerging technologies like Artificial Intelligence / Machine Learning, Internet of Things (IoT), Augmented Reality and so on. Therefore, instead of conventional norm of these departments functioning as silos, these departments are reengineered to function in an integrated, coordinated and are digitised in a seamless manner. This obviously leads to more complexity in implementation of digital technologies but also assures enhanced citizen/business satisfaction.

This four phase Gartner’s model is applicable in not just an organisation but could be equally valid in explaining a country’s evolution of e-government and e-governance.

Check Your Progress A:

- 1) “E-government and E-governance lowers several other related bureaucratic problems.” Comment..
.....
.....
.....
.....
.....

- 2) Write a short note on first phase of E-Governance.
.....
.....
.....
.....
.....

- 3) “E-governance and E-government has been one of the most striking and noticeable developments in governance.” Comment.

E-Governance

.....
.....
.....
.....
.....
.....

- 4) Discuss how the use of Internet based technologies raises the possibility for large-scale citizen participation in policy making process of government.

.....
.....
.....
.....
.....
.....

4.7 E-GOVERNANCE IN INDIA

Over the last two decades, there has been continual development and renewal of strategies and practices surrounding e-governance around the world. In every country governments around the world have embraced new information and communication technologies to increase the efficiency of internal processes, deliver better and more integrated services to citizens and businesses, invite citizen and stakeholder participation in planning decisions, improve communication, and sometimes even enhance democratic processes.

As other countries in the world, in India too digital technologies are becoming the main driving force in every sector of Indian economy. The governments at the National, State, and local levels, are increasingly adopting e-government technologies in public service delivery.

Most of the past or ongoing e-governance initiatives have been undertaken as part of the conventional planning and implementation framework. However, owing to the federal structure of governance in the country, leads to the complex interplay of situation, actors and processes influenced by multiple organizations operating at different layers.

In view of this, let us try to understand the journey of the country in e-government and e-governance spaces, by covering various milestones, explained in two parts – firstly from the year 1970s to 1990s when the basic digital infrastructure and the related organisations were established and then 1990s onwards when the country achieved major software and legal steps.

4.7.1 From 1970s to 1990s - Establishment of IT based Organisations

1. **Establishment of DoE in 1970** - First and foremost, the key milestone in this journey has been the establishment of Department of Electronics (DoE); understanding the increasing importance of electronics, the Government of India had established DoE in the year 1970 for better governance of technology implementation in the country.
2. **Establishment of NIC in 1977** - The successive formation of the National Informatics centre (NIC) in the year 1977 on the recommendations of Planning Commission of Government of India was the next major step in India as it brought ‘information’ into the national priorities.
3. **Use of Office Automation Software in Government Offices from 1977s- 1980s**
 - By the next decade, use of computers had spread to significant number of government offices but primarily for ‘word processing’.
 - Slowly and gradually, by early 1980s, with the increasing use of database software used for storage and retrieval of data, and with the development of networking technology, many government departments had started using IT for other government to government related activities such as payroll processing or inventory management.
4. **Establishment of NICNET and VSAT in 1987** : The main thrust for implementation of digital technologies in governance was spurred by the launching of NICNET in 1987 – the national satellite-which is a based computer network. MeitY (erstwhile DeitY; then the Department of Electronics) launched the national satellite-based computer network NICNET and installed V-SAT terminal at almost every district of the country. NICNET supported district information system of the National Informatics Centre programme to computerize all district offices in the country for which free hardware and software was offered to the state governments. For the next few years in 1980s and early 1990s, as the tele-connectivity and Internet connectivity progressed, a large number of e-government initiatives such as maintenance of land records, utility payments etc started mushrooming (but in isolation with each other), both at the central and state levels. (we would cover this aspect in details in the subsequent subsection)
5. **Establishment of DISNIC**: This was continued with the launch of the District Information System of the National Informatics centre (DISNIC) program to computerize and digitalize all the districts and their offices in the country for which free hardware and software was facilitated to make governance in the district easier and it was provided to the State Governments as well.
6. **Extension of NICNET in 1990s** - Also, NICNET was extended through the State capitals to all the district headquarters by 1990.

4.7.2 Growth of e-governance in India from 1990s to till Now

E-Governance

- 1990s: Railways & other initiatives:** It was in early 1990s, that the application of information communication technologies had started in government workplaces - both for internal automation as well as for public service delivery. Online railway reservation system (irctc.co.in) became the most prominent initiatives.
- Establishment of NTF :** A National Task Force (NTF) on Information Technology and Software Development was also constituted in May 1998. Information Technology was now being recognized as the frontier area of knowledge and Government of India (GoI) took a conscious decision to utilize ICT as an enabling tool for all concerns confronting government functioning.

After we have traced the genesis of some of the important milestones related to the establishment of digital infrastructure in the country, it is equally relevant to trace the growth of digital initiatives and related software advents of Government of India in public domain, particularly from 1990 onwards, in the subsequent subsection (Fig- 4.2).

- Year 2000- Information Technology Act:** In the year 2000, Indian government announced the ‘IT Act 2000’ of India that provided a legal framework to the digital initiatives in the country.

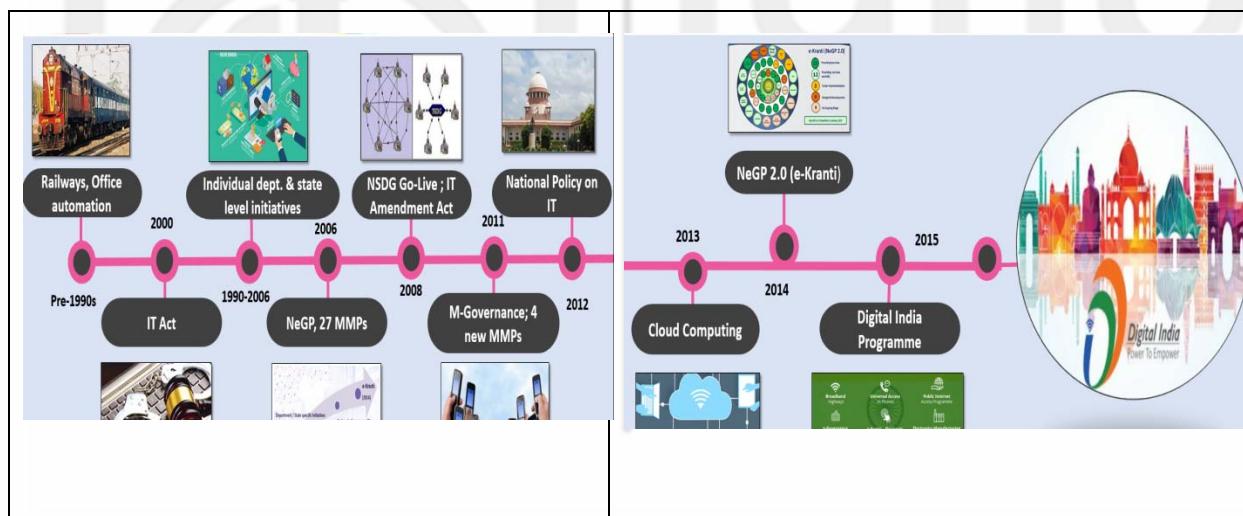


Fig 4.2 : Growth of e-Governance & e-Governance in India (1990s onwards till now)

- Year 2006- National e-governance Plan (NeGP):** GoI announced National e-governance Plan, referred as NeGP, in the year 2006. It comprised of twenty-seven Mission Mode Projects (MMPs) and eight components to “make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency and reliability of such services at affordable costs to realise the basic needs of the common man.”

Some of the mission mode projects, conceived under NeGP have been enhanced and made relevant for present times. One such example is Passport Seva Project.

Passport Seva Project: The Passport Seva Project one of best e-governance project of Government of India. It is well known in the world for smooth delivery of passport to Indian Citizens. The project has been implemented by the Ministry of External Affairs in Public-Private-Partnership with Tata Consultancy Services as the Service Partner. The project demonstrates how innovative use of Information and Communication Technology (ICT) can transform the way citizens receive services from government institutions. The entire process of citizen service delivery has been automated. Services are delivered through a country-wide networked environment integrating Passport *Seva Kendras* (PSKs), Passport *Seva Laghu Kendras* (PSLKs), Passport Offices and external stakeholders involved in the process viz. Police, India Security Press and India Post

5. Year 2008 to 2013 - IT Act Amendments, NSDG, National IT Policy, Implementation of Public Cloud and Mobile Seva Framework:

- The year 2008 saw amendments in the IT Act 2000. These amendments include enabling central government to issue rules time to time related with electronic signature as per the evolution of technology and penalized sending "offensive messages, pornography, child porn, cyber terrorism and voyeurism. It also gave authorities the power of "interception or monitoring or decryption of any information through any computer resource".
- In the same year, 2008, National Service Delivery Gateway-NSDG was launched as a standards-based messaging switch to provide seamless interoperability and to help in tracking and time stamping all transactions of the Government.
- The National Policy on IT was approved in the year 2012 to encourage adoption of ICTs to create a pool of 10 million additional ICT skilled manpower, to adopt Open standards and with several such IT focused national goals.
- In the year 2013, Government of India announced "GI Cloud" by the name of 'Meghraj'. It was rolled out to utilize and harness the benefits of Cloud Computing in governance domain.
- In the year 2013, Mobile Seva (the national mobile-governance initiative) was also formally launched with the aim of making India a world leader in harnessing the potential of mobile governance for inclusive development. Mobile Seva provides an integrated platform for all Government departments and agencies for delivery of public services to citizens and businesses over mobile devices using SMS, USSD, IVRS, CBS, LBS, and mobile applications. It is easily accessible through Mobile Applications Store (m-App Store) and the Mobile Governance Portal (<https://mgov.gov.in/>).

6. Year 2014 & 2015- Inception of MyGov and e-Kranti:

- Indian citizen engagement platform called 'Mygov.in' was established in the year 2014.

MyGov (<https://www.mygov.in/>) is a citizen engagement platform of Government of India that was launched on July 26, 2014. MyGov aims to establish a link between government and citizens to promote the active participation of Indian citizens in country's governance and development.

MyGov initiates dialogue with citizens to provide real contribution and not just sharing of theoretical ideas. The portal has around 70 Groups of various Government Departments and Ministries each designed around three modes of participation namely Do, Discuss and Disseminate. The 'Do' section consists of "Online and On-ground Tasks" that the citizens can undertake based on their interests. The Discuss section helps citizens to express their valued insights and views on theme-based discussions to improve government's policy initiatives. Citizens can participate in "group-centric" online discussions in the form of public consultations, open forums, etc and can share their thoughts and ideas. Any idea shared by a contributor is expected to be discussed on these discussion forums, allowing feedback and interaction among all the stakeholders. The third mode of citizen engagement, i.e., Disseminate, consists of information being categorized and spread through Blogs, Talks, Newsletters and a host of MyGov Microsites. Through Talks, defined on MyGov as "Dialogue with decision makers", citizens get an opportunity to connect and engage with government representatives through live chats. MyGov offers several avenues to the citizens to volunteer for various creative activities such as designing a slogan, participating in related contests, etc.

- In the year, 2015, e-Kranti : National e-governance Plan ver 2.0, was initiated with the vision of "Transforming e-governance for Transforming Governance" and had 44 Mission Mode Projects (MMPs)
- Further , Government of India announced its umbrella programme called Digital India in the year 2014 and formally launched it in the year 2015 with an aim to "transform India into a digitally empowered society and knowledge economy" for deriving economic, social, and environmental benefits from digital technologies.

4.7 DIGITAL INDIA

Digital India is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. It covers multiple Government Ministries and Departments.

Three vision areas of Digital India Programme (DIP) are as below:

1. **Infrastructure as a Utility to Every Citizen:** All the Indian citizens are available with high speed internet and a secure cyberspace as core

utility along with mobile connectivity and bank account to ensure citizens' participation in digital as well as financial spaces.

- 2. Governance and Services On-Demand:** Government is providing all the possible public services as well as all the citizen entitlements (such as documents, certificates) in real time using/cloud and/or mobile platform.
- 3. Digital Empowerment of the Citizens:** The third key vision area of DIP is based on the basic principle of "citizen centricity" that insists that the needs and aspirations of the citizens should help to chalk the design of digital interventions and to successfully ensure that citizens must be educated and sensitised about digital technologies.

4.7.1 Nine pillars of Digital India:

These vision areas of Digital India are expected to be achieved by nine pillars of Digital India viz. Broadband Highways; Universal Access to Mobile Connectivity; Public Internet Access Programme, e-governance : Reforming Government through Technology; e-Kranti Electronic Delivery of Services; Information for All; Electronics Manufacturing; IT for Jobs; and Early Harvest Programmes.

4.7.2 Key Initiatives of Digital India

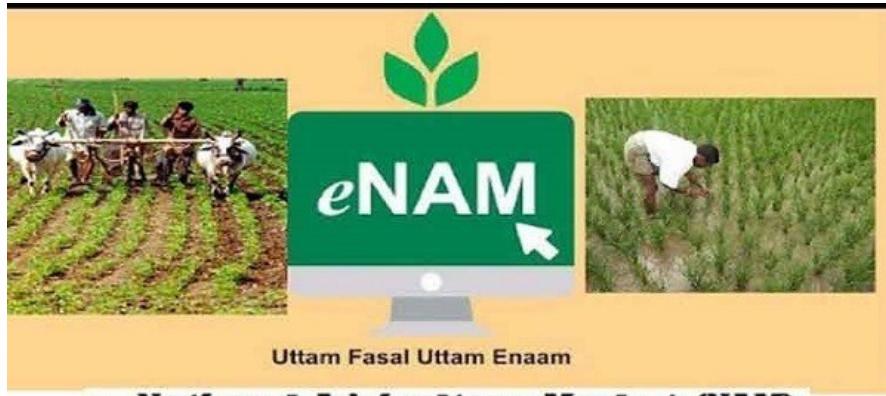
Some of the key initiatives of Digital India are summarised herewith (Fig 4.3)



Fig 4.3 : Some Interesting Digital India Initiatives (2014-2016) (Source : MeitY)

Without any specific order or preference, we shall proceed to give you a crisp glimpse into some of the interesting Digital India initiatives.

- 1. 'e-National Agriculture Market- e-NAM':**eNam serves as an electronic trading portal that has aggregated all the existing Agriculture Produce Marketing Committee (APMC) *mandis* (market places) across the country. e-NAM serves as a unified national digital marketplace with a single window access for all the agricultural commodities.



e- National Agriculture Market (NAM)

Fig 4.4: e-NAM

It provides information about commodity arrivals and their prices; purchase and selling trade offers; provision to respond to trade offers, etc. Hence, eNAM ensures that farmers are not exploited due to lack of knowledge and are able to make sound economic decisions.

2. **Fertilizer Monitoring System (FMS):** FMS checks for fake claims, pilferages, etc., and thus aims to create an ecosystem where the subsidized fertilizers are delivered to the actual farmers and proposes to generate substantial savings to the tune of several thousand crores every year.
3. **Soil Health Card:** The Soil Health Card Scheme was launched in the year 2015 to promote Integrated Nutrient Management (INM) of the soil through judicious use of chemical fertilizers. It provides tailored information on secondary and micronutrients present in the soil in conjunction with organic manures and bio-fertilizers to help provide customised soil test-based recommendations.
4. **GeM:** GeM is a short form of one stop ‘Government e-Marketplace’ hosted by Directorate General of Supplies and Disposals (DGS&D) under Ministry of Commerce and Industry, Government of India, where common user goods and services can be procured. GeM is dynamic, self-sustaining and user friendly portal for making procurement by Government officers. Public procurement forms a very important part of Government activity and reform in Public Procurement is one of the top priorities of the present Government. Government e-Marketplace (GeM - gem.gov.in) is a very bold step of the Government with the aim to transform the way in which procurement of goods and services is done by the Government Ministries and Departments, Public Sector Undertakings and other apex autonomous bodies of the Central Government.
5. **DigiLocker:** DigiLocker is a key initiative under Digital India, the Government of India's flagship program aimed at transforming India into a digitally empowered society and knowledge economy. Targeted at the idea of paperless governance, DigiLocker is a platform for issuance and verification of documents & certificates in a digital way, thus eliminating

the use of physical documents. The DigiLocker website can be accessed at <https://digitallocker.gov.in/>.

6. **PMGDishा:** The Pradhan Mantri Gramin Digital Saksharta Abhiyan is a dynamic and integrated platform of digital literacy awareness, education and capacity programmes that will help rural communities fully participate in the global digital economy. Focus is on making technology central to enabling change.
7. **e-Granthalya:** e-Granthalaya is a Digital Platform developed by National Informatics Centre, Ministry of Electronics and Information Technology, Government of India. It is Web-based Integrated Library Management Software for Government Libraries for Automation of in-house activities as well as member services and Networking for resource sharing. On this platform, complete ICT solution with Digital Library Module, Cloud hosting environment and a Library Portal (OPAC) with NICSI empanelled Roll-out Services and support. It is useful to transform traditional libraries to e-Library with Digital Library Services and to provide various online member services using Single Window Access System. Latest version of e-Granthalaya (Ver.4.0) is a 'Cloud Ready Application' and provides a Web-based solution in enterprise mode with a centralized database for cluster of libraries.

e-Granthalaya Ver.4.0 (eG4) will only be available in NIC Data Centre/National Cloud for Ministries and Government Departments libraries, from both Central as well as State Governments, and other Government funded organizations / autonomous bodies. Indian Army / Indian Navy and other Para-military Organizations will host the application and database in their own Network which is generally INTRA with their maintenance and support.

List of organizations eligible to get implementation of e-Granthalaya 4.0 include Government Libraries under Ministries/Departments/ Organizations of Central /State Governments, Government Public Libraries, KendriyaVidyalayas and Jawahar Navodaya Vidyalayas / MHRD, Central /State Government Schools/Colleges/Polytechnics/ Universities, Autonomous Bodies / Councils / Research Organizations / National Laboratories/IITs/IIMs/NIITs / PSUs of Centre and States, Other Government Academic Institutions funded by Government, Indian Embassies, Indian Army / Navy / Air Force Libraries

List of Organizations Not Eligible for Software include Private Institute/Colleges/Schools/Universities and aided/autonomous Institute/ Colleges/Schools/Universities

8. **UMANG:** UMANG (Unified Mobile Application for New Age Governance)- A single mobile platform for all Indian citizens to access central, local and other government services that provides seamless integration with popular customer-centric services including Aadhaar and Digilocker. It has been made available through mobile application, web, IVR and SMS and is expected to revolutionize the way how an

9. **TDIL:** The Ministry of Electronics and Information Technology initiated the ambitious programme of TDIL (Technology Development for Indian Languages) with the aim of developing Information Processing Tools and Techniques to facilitate human-machine interaction without language barrier; creating and accessing multilingual knowledge resources and integrating them to develop innovative user products and services. The primary objectives include developing and promoting Software Tools and Applications for all 22 officially recognized Indian Languages, contributing to collaborative development of futuristic technologies leading to innovative products and services, acting as a catalyst for proliferating Language Technology products and providing solutions and standardization across all levels.
10. **NKN:** National Knowledge Network (NKN) is a multi-gigabit national research and education network, whose purpose is to provide a unified high speed network backbone for educational institutions in India. The network is managed by the National Informatics Centre.

The initiatives mentioned above, have been primarily undertaken by Central / Union Government of India. At present there are 44 such mission mode projects in e-Kranti pillar of Digital India, some of which are to be exclusively initiated by Centre, some by state and some of them jointly.

4.9 STATE E-GOVERNANCE INITIATIVES

Majority of the states too have independently (or with the support of Central government) implemented digital technologies in their respective states. Two of the same have been presented here.

- a. **Akshaya in Kerala:** One of the initial and popular initiative by Government of India is Akshaya in Kerala. Approximately 5000 multipurpose community technology centres called Akshaya e- *Kendras* were set up in the state of Kerala. Managed by private entrepreneurs, each e-Kendra was set up within 2-3 kilo-meters of every other household, to cater to the requirements of around 1000-3000 families to try and make available the power of networking and connectivity which is possible within a group of people and common man. Akshaya had aimed to ensure social and economic equity in the state by providing focus on the various facets of e-learning and e-government.
- b. **Real Time Performance Monitoring in Andhra Pradesh:** Government of Andhra Pradesh launched “Real Time Governance- RTG” (on November 26, 2017) through CM Office Real-time Executive Dashboard (CORE Dashboard- launched in December 2016). CORE is an integrated dashboard to display category-wise key performance indicators- KPIs of various departments/schemes in real time of various departments/schemes/programmes, which are expected to be updated by each department every one hour. The dashboard displays current

situation and department reports (e.g. agricultural land area sown, rainfall status, demand/supply of power, irrigation) to both public and officials alike.

Over the last two decades, there has been continual e-governance development across almost all states of the country. These two initiatives (Akshaya in Kerala and RTG in Andhra Pradesh) are just examples of e-government/ e-governance initiatives undertaken at the state level in India to give a glimpse into such advents at the state level.

Check Your Progress B:

- 1) State the workings of Akshaya E- Kendras around Kerala.

.....
.....
.....
.....
.....
.....

- 2) List the various organizations eligible to get implementation of E- Granthalaya 4.0.

.....
.....
.....
.....
.....

- 3) What are the nine pillars of Digital India.

.....
.....
.....
.....
.....

- 4) What is the National E-governance Plan?

.....
.....
.....
.....
.....

The growth of e-governance and e-government has been one of the most striking and noticeable developments of the web world, the global shifts towards increased positioning of information technology by the government came up in the nineties, with the arrival of the world wide web.

Application of digital technologies in public domain propels public services to be fast and convenient service for citizens; it leads to the reduction in delays, red tape and corruption effective utilization of resources, enhanced citizen participation, integration of public services offered by different departments.

Though the terms e-governance and e-government are used interchangeably, the term ‘e-governance’ has a greater scope and connotation than e-government. The term, ‘e-Government’ is defined as the use of information and communication technologies by government in delivering public information, services, and public goods to its citizens. E-governance, on the other hand, enables new ways of involving citizens and communities in online debates on issues of public concern. E-governance is generally considered as a bigger concept than e-government, because it can bring about a difference in the way citizens relate to governments and to each other. Its main concern is to be able to engage, enable and empower the citizens.

Evolution of e-government could be understood by the model given by Gartner that has four phases namely as Information, Interaction, Transaction and Transformation.

The journey of India in e-government and e-governance spaces, could be best understood in two parts – firstly from the year 1970s to 1990s when the basic digital infrastructure and the related organisations were established and then 1990s onwards when the country achieved major software and legal steps. For example, in the year 2000, Indian government announced the ‘IT Act 2000’ of India that provided a legal framework to deal with cybercrimes related to digital initiatives and e-commerce. It was amended in the year 2008 to penalize sending “offensive messages, pornography, child porn, cyber terrorism and voyeurism. It also permitted public authorities to intercept, monitor or decrypt any information “through any computer resource”.

In the year 2006, GoI had announced National e-governance Plan, referred as NeGP that had consisted of twenty-seven Mission Mode Projects. (MMPs) and eight components to “make all Government services accessible to the common man in his locality”.

In the year 2014, Digital India Programme was announced as the flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. It covers multiple Government Ministries and Departments. These three main vision areas are ‘infrastructure as a utility to every citizen’, ‘governance and services on-demand’ and ‘digital empowerment of the citizens. These three vision areas

are to be achieved through nine pillars *viz.* Provision of broadband highways, universal access to mobile connectivity, public internet access programme, e-Governance, e-Kranti, information for all, electronics manufacturing, IT for jobs and early harvest programmes. Digital India has led to the establishment of several e-government initiatives including Passport e-Seva, e-NAM, FMS, Soil Health Card, GeM, DigiLocker, PMGDisha, e-Granthalaya, UMANG, TDIL, NKN and many more. At present there are 44 such mission mode projects in e-Kranti pillar of Digital India, some of which are to be exclusively initiated by Centre, some by state and some of them jointly.

MyGov is an impressive e-governance initiative by Government of India that provides a digital platform and an app to the citizens of the country for participating in various public contests such as design of taglines, logos, slogans as well as to contribute their opinions in the public policy formulation process

4.11 KEYWORDS

Digital India: Digital India is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. It covers multiple Government Ministries and Departments.

E-governance: E-governance is regarded as an ICT-based tool for giving power to democracy and supporting development. It can bring about a difference in the way how citizens relate to governments and to each other. Its main concern is to be able to engage, enable and empower the citizens.

E-Government: E-Government is defined as the use of information and communication technologies, particularly the Internet, as a tool to be a better government. It mainly refers to the automation of services managed by the government, and delivery of public services and administrative information to the citizens using ICT.

Information Technology IT Act, 2000: In the year 2000, Indian government announced the ‘IT Act 2000’ of India that provided a legal framework to the digital initiatives in the country. It is the primary law in India dealing with cybercrime and electronic commerce. It was further amended in the year 2008.

National e-Governance Plan (NeGP): GoI announced National e-governance Plan, referred as NeGP, in the year 2006. It consisted of twenty-seven Mission Mode Projects. (MMPs) and eight components to “make all Government services accessible to the common man in his locality.

4.12 TERMINAL QUESTIONS

- 1) What do you understand by E-governance? State its importance.
- 2) State the evolution of E-governance with the help of Gartner’s model.

- 3) State the role of E-governance in India. **E-Governance**
- 4) What are the three main vision areas of Digital India Programme (DIP)?
- 5) Write a short note on the followings:
- a) MyGov.in
 - b) E-*Granthalaya*
 - c) *Digital India*
- 6) State the difference between E-Commerce and E-governance.



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.



BLOCK 2
E-PAYMENT SYSTEM



BLOCK 2 E-PAYMENT SYSTEM

This is the second block of the course “E-Commerce”. This block will familiarise you with the basic introduction to E-payments system, various payment methods and gateways, E banking and various services and facilities offered by e-banking. This block is structured to cover the fundamentals and preliminary aspects of the e-payment system. The block on the theme “E-Payment System” comprises of two units, the details of which are mentioned below:

- **Unit-5:** This unit briefs about the overview, meaning and distinction of e-payment from conventional payment. The unit also explains about the various payment gateways, various steps about functioning of payment gateways as well as the difference types of online payment methods such as credit cards, cyber cash, internet cheques, smart cards e-wallets etc.
- **Unit-6:** This unit makes the learners familiarise with the meaning, concept and importance of E-banking. The unit also discusses the electronic fund transfer methods such as NEFT, RTGS, IMPS, their requirements and distinction with each other. The later part of the unit briefs on the virtual currencies, Automated Clearing House and concept, advantages and uses of Distributed Ledger Technology, etc.



UNIT 5 E-PAYMENT

Structure

- 5.0 Objectives
- 5.1 Introduction
- 5.2 Overview of Payment System
- 5.3 Meaning of E-Payment
- 5.4 Difference between E-Payment & Conventional Payment
- 5.5 Payment Gateways
 - 5.5.1 What is a Payment Gateway?
 - 5.5.2 Process of Payment Gateway
 - 5.5.3 Securing Information through Payment Gateway
 - 5.5.4 Examples of a Payment Gateway
- 5.6 Steps about functioning of a Payment Gateway
 - 5.6.1 Steps showing a typical E-Payment System
- 5.7 Types of Payment Gateways
 - 5.7.1 Hosted Payment Gateways
 - 5.7.2 Self Hosted Payment Gateways
 - 5.7.3 API hosted payment Gateways
 - 5.7.4 Local bank integration Gateways
- 5.8 Types of Payment Methods
 - 5.8.1 Credit Cards
 - 5.8.2 Cyber Cash
 - 5.8.3 Internet Cheques
 - 5.8.4 Smart Card
 - 5.8.5 Cash Payment System
 - 5.8.6 E-Wallet
 - 5.8.7 Crypto Currencies
- 5.9 Requirements Metrics of a Payment System
- 5.10 Merits of E-Payment System
- 5.11 Risks Involved in E-payment
- 5.12 Let Us Sum Up
- 5.13 Keywords
- 5.14 Answers to Check Your Progress
- 5.15 Terminal Questions

5.0 OBJECTIVES

After going through this unit, you should be able to:

- understand about the payment system;
- know the difference between Payment system and Electronic Payment system;
- know how government regulate payment system; and
- understand the risks involved in payment system.

5.1 INTRODUCTION

Digital disruption is redefining banking industries and changing the manner businesses functions and bringing paradigm shift in e-business too. Every industry is assessing options and adopting ways to generate value in the technology-driven world. In the present scenario payments are life blood of a business. It is imperative to choose a system that integrates well with your business and meets all your payment needs. Online payments system has turned out to be a part of our daily lives. We are transacting online not only through debit or credit cards but through numerous other modes like UPI, net-banking and wallets or e-wallets as well. Paying online is a fundamental feature that every e-commerce platform in the world offers and India is not an exception to that.

Progressively or rather traditionally, people trade goods and use services by making payments using cash as ready money which was the major medium of exchange in the past. Banks have urbanized a variety of payment methods to make feasible the exchange of money that stimulates the growth of commerce, helps economic development and facilitates flexibility with lower transaction costs with security. A variety of payment systems exist in the present day, ranging from cheques, wire transfer, cards to online transfer, and Unified Payment Interface (UPI). This payment system reconcile financial transactions through the transmission of monetary value. This includes the institutions, instruments, people, rules, procedures, standards, and technologies that make its exchange possible.

In a contemporary world Blockchain technology has been introduced which promises to smoothen the process of fast, secure transaction through the use of encrypted Distributed Ledgers Technology (DLT) that endow with trusted real-time verification of transactions without the need for intermediaries such as correspondent banks and clearing.

In this unit we will discuss different types of payment methods that are available today with banking channels in India which work as a driving force in remittances or alternate banking channels which can be utilized by banks for acquiring, tracking and serving customers through multiple channels. This focuses on fund transfers, third party transfers, utility payments using through banking channels. Features such as AI bots, digital payment advisers and biometric fraud detection mechanisms lead to higher

quality of services to a wider customer base. All this translates to increased revenue, reduced costs and boost in profits.

E-payment

5.2 OVERVIEW OF PAYMENT SYSTEM

A payment system is any system used to reconcile financial transactions through the transmission of monetary value. This includes the institutions, instruments, people, rules, procedures, standards, and technologies that make its exchange feasible. Some payment systems also consist of credit mechanisms, which are essentially a dissimilar aspect of payment. Payment systems are used in lieu of tendering cash in domestic and global transactions and consist of a major service given by banks and other financial institutions. Customary payment systems take account of negotiable instruments such as drafts (e.g., cheques) and documentary credits such as letters of credit. The present payment system or rather a contemporary payment system straightforwardly integrates point of sale and delivers a robust payment experience for both merchant and customer. It connects merchants to a total payment ecosystem, from merchant services to remote terminal solutions, to hardware. Banks have developed a range of payment methods to make easy the exchange of money that stimulates the expansion of commerce, helps economic development and facilitates elasticity with lower transaction costs with security. Various payment systems exist in the present day, ranging from cheques, wire transfer, cards to online transfer procurement. We will talk about all these omnipresent terminologies which come under the ambit of E-payment system in coming heads in a gradual manner.

5.3 MEANING OF E-PAYMENT

When we purchase goods and services online through an e-commerce portal, we pay for them using an electronic mode which is a preferred mode of payment in present scenario. This method of payment, without using cash or cheques, is called an e-commerce payment system and is also known as online or electronic payment systems.

An electronic payment (e-payment), in short, can basically defined as paying for goods or services on the internet or through gateway to pay amount. It includes all financial operations using electronic devices, such as computers, smartphones or tablets. E-payments can be made in many ways, like credit or debit card payments or bank transfers.

The term electronic payment refers to a payment made from one bank account to another using electronic methods and forgoing the direct intervention of bank employees. Barely defined electronic payment refers to e-commerce in which payment for buying and selling goods or services offered through the Internet, or broadly to any nature of electronic funds transfer.

Modern payment systems use cash-substitutes as compared to traditional payment systems. This includes debit cards, credit cards, electronic funds

transfers, direct credits, direct debits, internet banking, E-wallet, virtual currency using blockchain and e-commerce payment systems. An electronic payment is any kind of non-cash payment that doesn't involve a paper check. Methods of electronic payments include credit cards, debit cards and the ACH (Automated Clearing House) network. The ACH system comprises direct deposit, direct debit and electronic checks (e-checks). Artificial Intelligence is the panorama of banking as it brings the power of advanced data analytics to combat fraudulent transactions and improve compliance. Features such as AI bots, digital payment advisers and biometric fraud detection mechanisms lead to advanced quality of services to a wider customer base.



Fig 5.1: Electronic Payment System

The basic characteristics of e-payment system are applicability, ease of use, security, reliability, trust, scalability, convertibility, interoperability, efficiency, anonymity, traceability, and authorization type.

5.4 DIFFERENCE BETWEEN E-PAYMENT & CONVENTIONAL PAYMENT

The functioning atmosphere of e-payment is based on an open system platform i.e. internet, while the long-established payment is operated in a relatively closed system. E-payment uses most advanced communication means, such as the internet and extranet, whereas, customary payment uses traditional communication media. If we set up with defining a conventional process of payment and settlement involves a buyer-to-seller transfer of cash or payment information (for example, credit card). A cash payment requires a buyer's withdrawal from his bank account, a transfer of cash to the seller, and the seller's deposit of the payment to his account, which is a cumbersome process or rather a tedious time taking approach. We will discuss about the difference with the help of a comparative table in a more elaborative manner to study.

Table 5.1: Difference between Traditional Payment and E-Payment

SL. NO.	PARTICULARS	TRADITIONAL PAYMENT	E-PAYMENT
1.	Usage	Use Traditional Medium to communicate	Use advance technology to communicate

2.	Circulation	Traditional payment is realized through physical circulation such as cash circulation, bill transfer and bank exchange.	E-payment introduces digital circulation to realize information transmission, so all means of e-payment are digitalized	E-payment
3.	Requirement	Uses traditional medium to communicate between parties	Requirement network and other related software to work	
4.	Intervention	Needs human intervention to settle these processes	Uses advance technology to handle all the transaction process that requires money engagement such as money transfer.	

© SOMS, IGNOU

5.5 PAYMENT GATEWAYS

In our preceding head we have seen that how the online payments are fast and well-situated when we compare with stereotype payment system and on the other hand it is the need of the hour, with a frame of mind to buy products and services by crossing territorial boundaries. If you are a seller, you can put up your product for sale to everybody in the world using a decent internet connection and good bandwidth. The noteworthy factor which works as a driving force over and above the Smartphone is the payment gateway. This particular sub-head is going to answer certain frequently asked questions such as whether it is safe to transact through a payment gateway? Does it make logic for a business to have payment gateway integration? Let's find out by defining the term gateway vis-à-vis payment.

Today, many businesses have moved away from more traditional payment methods (such as direct bank transfer) to payment gateways because they enable instant payment, credibility for merchants, real-time payments, security, among other benefits.

5.5.1 What is a Payment Gateway?

A payment gateway is an online application (characteristically used in e-commerce) that conducts payment authorizations for merchants, electronically based businesses (e-businesses), merchants with mutually brick and mortar locations and online locations and merchants with long-established brick and mortar stores. As long as there is an internet connection, a payment gateway steadily connects to an e-commerce application or in-house payment application such as a credit card processing network or an online banking institution.

Payment gateways are the “middle man,” handling business between merchants and customers serving in a position that steadily withdraws the

funds for a transaction from customers and deposits them into merchant's bank account. A payment gateway is a digital version of the physical point of sale (POS) terminals located in approximately all of today's retail outlets.

For setting up an ecommerce store or selling digital products through a website a payment gateway is a pre-requisite or a mandatory component. Payment gateways are the consumer-facing interfaces which are used to collect payments. A payment gateway is the technology that captures and transfers payment data from the customer to the acquirer. It is used not only by merchants to recognize debit or credit card purchases from customers. The term includes not only the physical card-reading devices found in brick-and-mortar retail stores but also the payment processing portals found in online stores. On the other hand, brick-and-mortar payment gateways in recent years have begun accepting phone-based payments using Near Field Communication (NFC) technology.

Payment gateway is essentially a bridge or connection pathway between the customers and the relevant financial institution. Gateways are a link between the merchant's website and a payment provider or banking network. Essentially, they act as a "wire" that connects the site to a payment provider and allows secure payment data to flow back and forth.

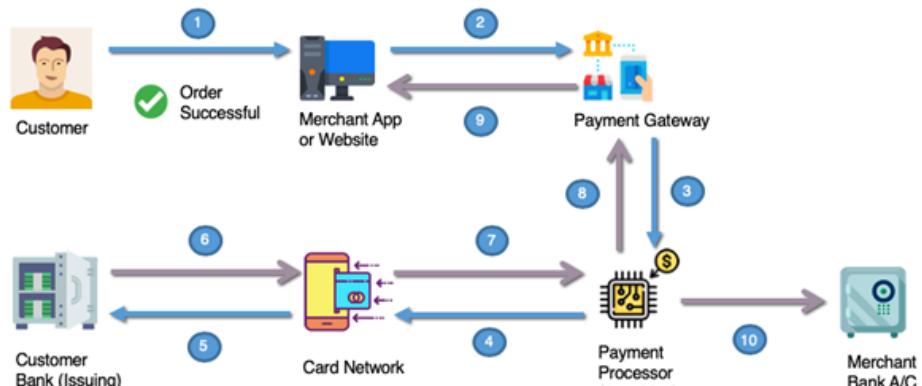


Fig 5.2: Payment Gateways

From the above figure it is well versed that an online payment gateway (PG) is a tunnel that connects the recipient's bank account with a sender's bank account in the platform where money need to transfer. Thus, it is an application software that authorizes to accomplish an online transaction through different payment modes like net banking, credit card, debit card, UPI or the many online wallets that are available these days.

A PG plays the role of a third party that securely transfers your money from the bank account to the merchant's payment portal.



Fig 5.3: Roles of Payment Gateways

5.5.2 Process of Payment Gateway

Before we look deeper the definition of a payment gateway, we need to make out the key players in online payments. When a customer clicks on the “Pay” button on your website, these are the key players involved in the payment process:

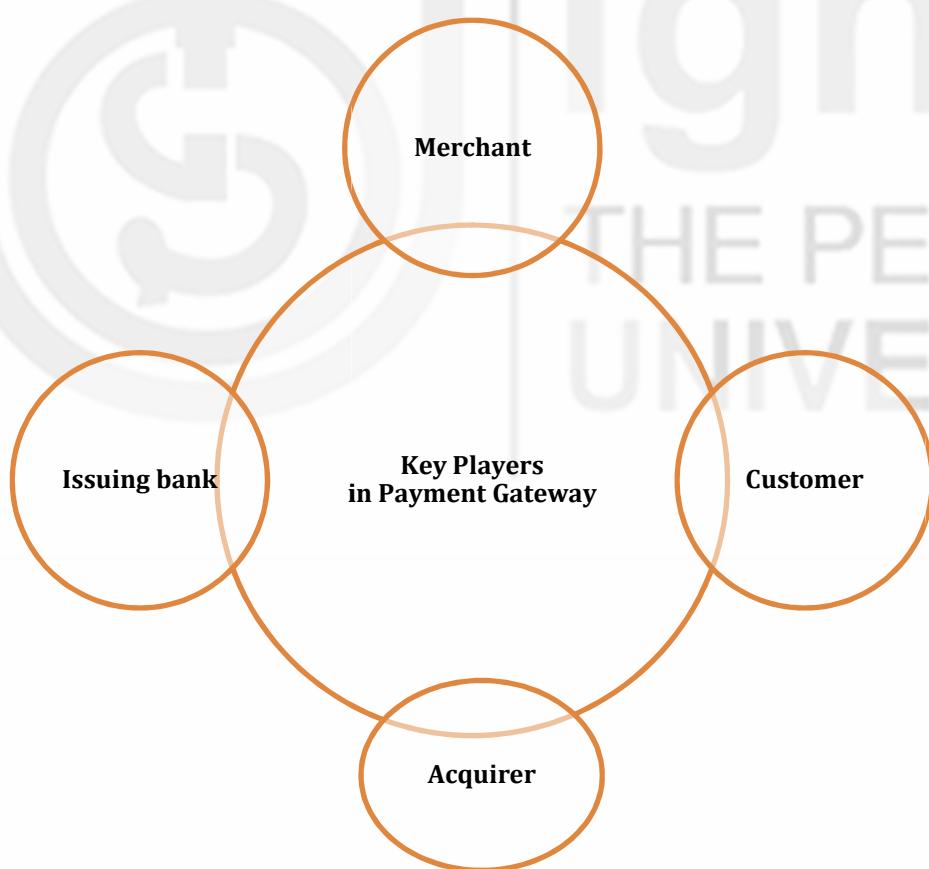


Fig 5.4: Key players in a Payment Gateway

- **Merchant:** An online business operating in any vertical (travel, retail, ecommerce, gaming, Forex, buying, shopping,etc.), offering a product or service to customers.
- **Customer:** Customer also called a cardholder, who wants to access the products or services that the merchant is selling, and initiates the transaction.
- **Issuing bank:** The issuing bank is the customer's bank that issues the card holder's credit or debit card on behalf of the card schemes (Visa, MasterCard).
- **Acquirer:** This also acknowledged as the acquiring bank, the acquirer is the financial institution that maintains the merchant's bank account (known as the merchant's account). The acquiring bank passes the merchant's transactions to the issuing bank to obtain payment.

Thus, from figure 5.3 it is well versed that a payment gateway allows merchants to securely pass credit or debit card or a wallet information between the customer, merchant and the payment processor. The payment gateway is the middleman between the merchant and their sponsoring bank. A payment processor is the company that a merchant uses to handle.

5.5.3 Securing Information through Payment Gateway

In our preceding section we have learnt that how important the payment gateway is. In this section we will ensure that the security of the information you need is saved and much important secure. Online payment security is becoming one of the important issues as in facilities in. Defending customers against attacks over the internet and cyber theft to achieve their trust is becoming very decisive and one of the most vital tasks for business owners. For business owners, it is significant to ensure utmost security measures to safeguard business as well as their customers from the risks in online payments. If a customer trusts an online business and shares payment information, it is the merchant's responsibility to provide a secure and seamless buying experience. Online payment fraud rate is increasing with an alarming rate and may keep on rising.

When setting up a payment gateway on e-commerce site, we will need to make quite a few decisions. Two of the most significant decisions are the type of merchant account we opt and ensuring that the customers' payments are secure. A payment gateway focuses on securing the sensitive information given by the user throughout the process. It ensures security by encrypting data like card and bank details that have been provided by the user in due course. Here is a list of things that a payment gateway carries out to keep the data safe:

- First things first, the entire transaction is carried out through an HTTPS web address. This is unusual from the HTTP as the S in the HTTPS stands for Secure. The transaction takes place throughout this same tunnel.

- As a consequence of the hash function, the system often uses a signed request from the merchant to authenticate the appeal of the transaction. This signed request is a secret word, which merely the merchant and the payment gateway know.
- To secure the payment page result of the process, the IP of the requesting server is verified to perceive any malicious activity.
- Virtual Payer Authentication (VPA) is something that the acquirers, issuers and the payment gateways back to secure the process. VPA, implemented under the 3-D secure protocol, adds an additional layer of security and helps the online buyers and sellers to authenticate.

5.5.4 Example of a Payment Gateway

Credit cards, debit cards, net-banking, e-wallets etc. are ensuring a safe and suitable way attracting more and more customers to buy from the web. Payment gateways are making this easier every day. When any organization establishes an ecommerce business, it should think vigilantly about how to acknowledge payments online to meet user expectations and deal with the cash flow of his/her business viably.

Few example of Payment Gateways are given below:

- CCAVenue's mobile SDKs facilitate smooth and easy integration of payments directly into your iOS, Android or Windows mobile application. Faster payment processing, fewer clicks and intelligent retry feature helps in significantly improving transaction success rate and reducing cart abandonment, thus delivering a beautiful and seamless payment experience.
- Large banks such as Bank of America (BAC) and JPMorgan (JPM) have sophisticated payment gateway systems that they offer to customers along with their own merchant acquiring bank services.
- Snapdeal owned digital payments platform FreeCharge has partnered with a payment gateway CCAvenue to strengthen its offline offerings, as it gains access to over one lakh online merchants across sectors like hospitality, retail and education.
- Flipkart used CCavenue&PayU but now it's using Payzippy.
- Amazon Pay is vital to provide the same easy, trusted experience to hundreds of millions of Amazon customers

Thus, once a credit card's testimonials has penetrated into the payment section of an e-commerce website, the payment gateway encrypts the perceptive details of the card to secure both the consumer and the merchant from fraudulent activity as the information is passed between the two during their transaction. The payment gateway then routes that information to the merchant's issuing bank for authorization, and then consequently notifies the merchant of the transaction's status (authorized or declined). Last but not least, the payment gateway settles funds with the merchant after the issuing bank settles the funds with the gateway.

Check Your Progress A

1. Fill in the blanks with appropriate words:
 - i) The system comprises direct deposit, direct debit and electronic checks (e-checks).
 - ii) uses traditional medium to communicate, whereas uses advance technology to communicate.
 - iii) E-payment introduces to realize information transmission, so all means of e-payment are digitalized.
 - iv) A payment gateway is a digital version of the physical terminals located in approximately all of today's retail outlets.
 - v) The is the financial institution that maintains the merchant's bank account
2. State whether the following are true or false.
 - i) Online payment fraud rate is increasing with an alarming rate and it will keep on rising for that security could be an important measures.
 - ii) The acquiring bank is the customer's bank that issues the cardholder's credit or debit card on behalf of the card schemes.
 - iii) Payment gateway is essentially a bridge or connection pathway between your customers and the relevant financial institution.
 - iv) Virtual Payer Authentication (VPA) is something that the acquirers, issuers and the payment gateways are backing to secure the process even more.
 - v) Merchant is a cardholder, who wants to access the products or services that the merchant is selling, and initiates the transaction.
3. What is a Payment Gateway?
.....
.....
.....
.....
.....

4. Who is a merchant in payment gateways?
.....
.....
.....
.....
.....

5.6 STEPS REGARDING FUNCTIONING OF A PAYMENT GATEWAY

E-payment

In our preceding section, we have observed that a payment gateway focuses on securing the sensitive information given by the user throughout the process. It is a technology which can be used by merchants to accept debit or credit card purchases from customers. The term includes not only the physical card-reading devices found in brick-and-mortar retail stores but also the payment processing portals found in online stores. It ensures security by encrypting data like card and bank details that have been provided by the user. There are four simple steps in the payment gateway process:

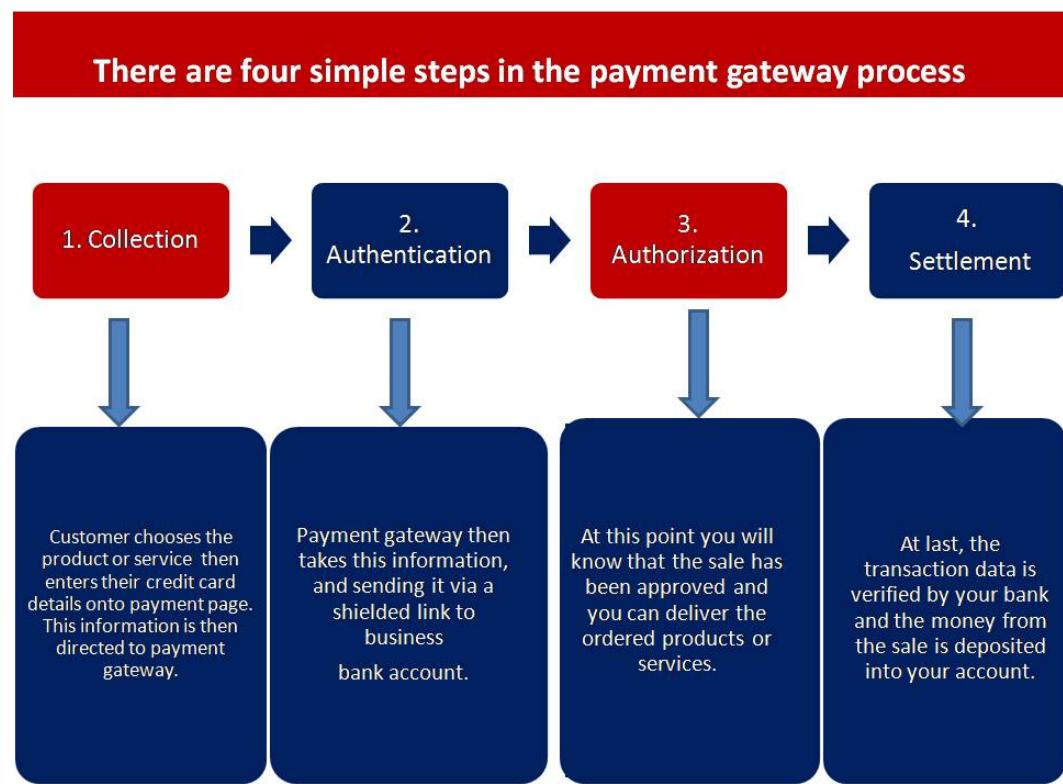


Fig 5.5: Steps about functioning of a payment gateway

5.6.1 Steps Showing a Typical E-Payment System

The following are the basic steps showing how a typical payment gateway works:

E-Payment System

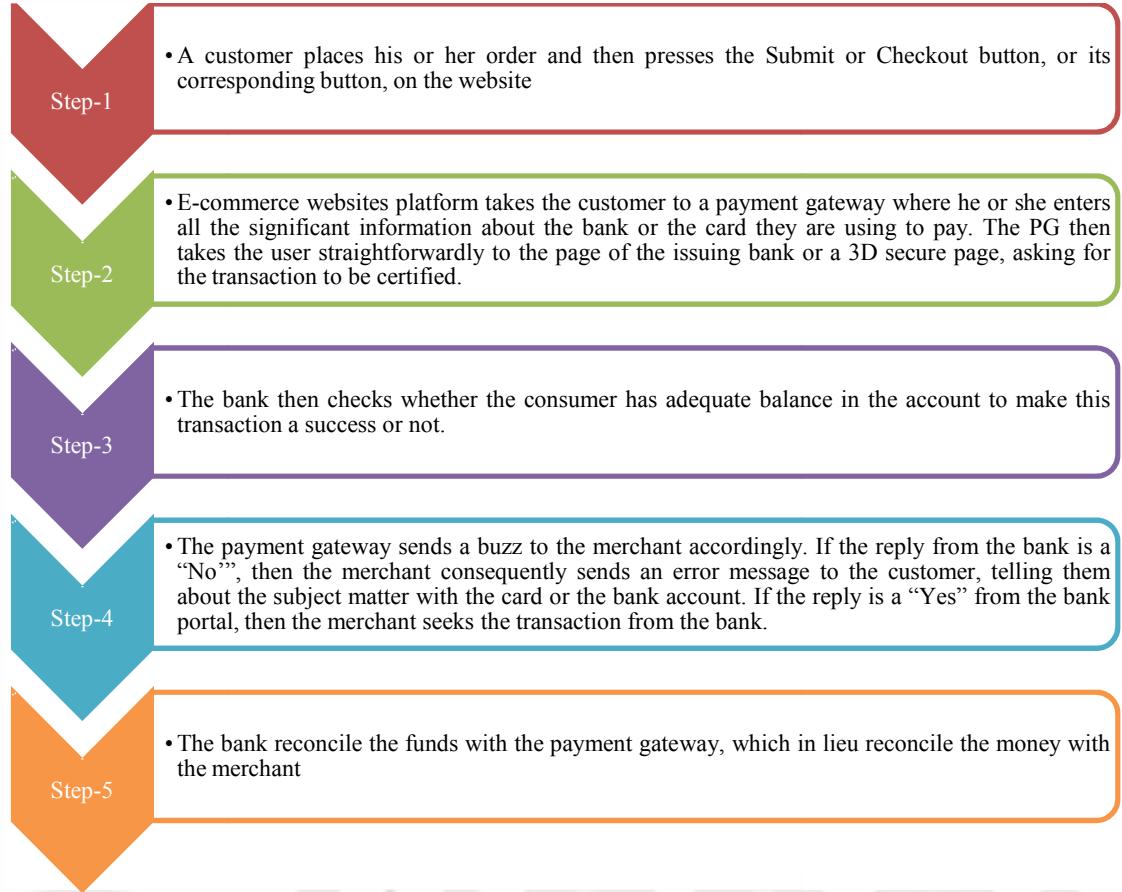


Fig 5.6: Steps showing a typical e-payment system

Once this procedure is completed, the customer gets an authentication message of the order being placed. As mentioned earlier, the transaction of money involves sensitive information about a person's bank and card details that are entirely personal to him or her. Consequently, it is imperative to make sure that this information stays safe.

5.7 TYPES OF PAYMENT GATEWAYS

We have seen in our previous heads that how a payment gateway work as a merchant service provider and facilitates an e-commerce application service provider that authorizes direct payments processing for e-businesses, online retailers, bricks and clicks, or traditional brick and mortar. The payment gateway may be provided by a bank to its customers, but can offer a dedicated financial service provider as a separate service, such as a payment service provider. Ecommerce payment gateways are used to handle payment transaction services through a secured gateway to make a payment for the customer orders.

The various types of payment Gateways are discussed below:

5.7.1 Hosted Payment Gateways

Hosted payment gateways direct the customer away from the site's checkout page. When the customer clicks the gateway link, they are redirected to the Payment Service Provider (PSP) page. Here, the customer fills in his or her payment details, and after paying, is redirected back to the website to

complete the checkout process. The most well-known example of a hosted payment gateway is PayPal.

E-payment

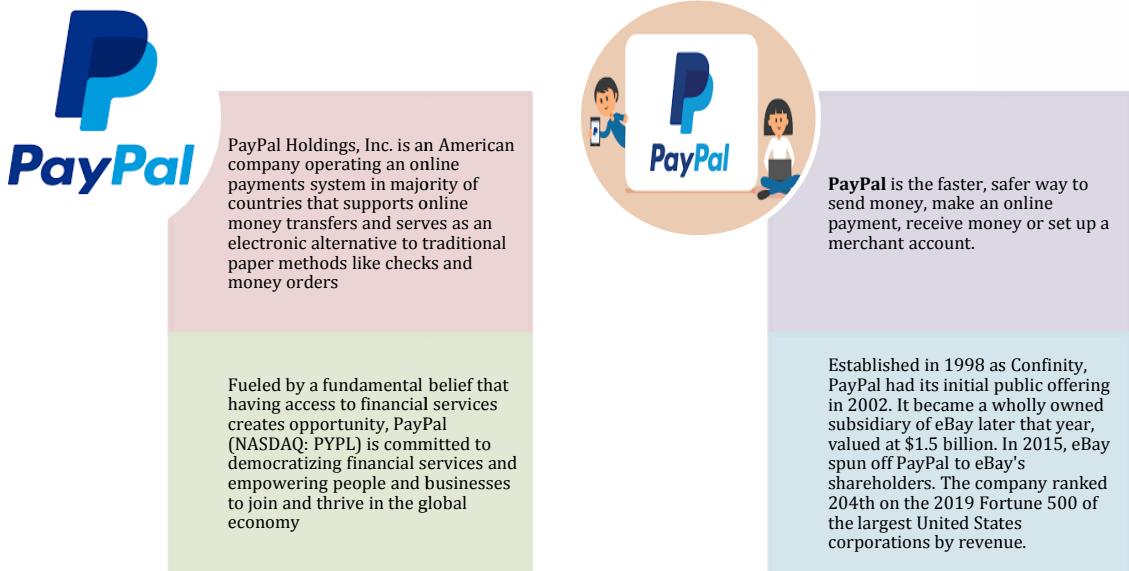


Fig 5.7: Example of Hosted Payment Gateway

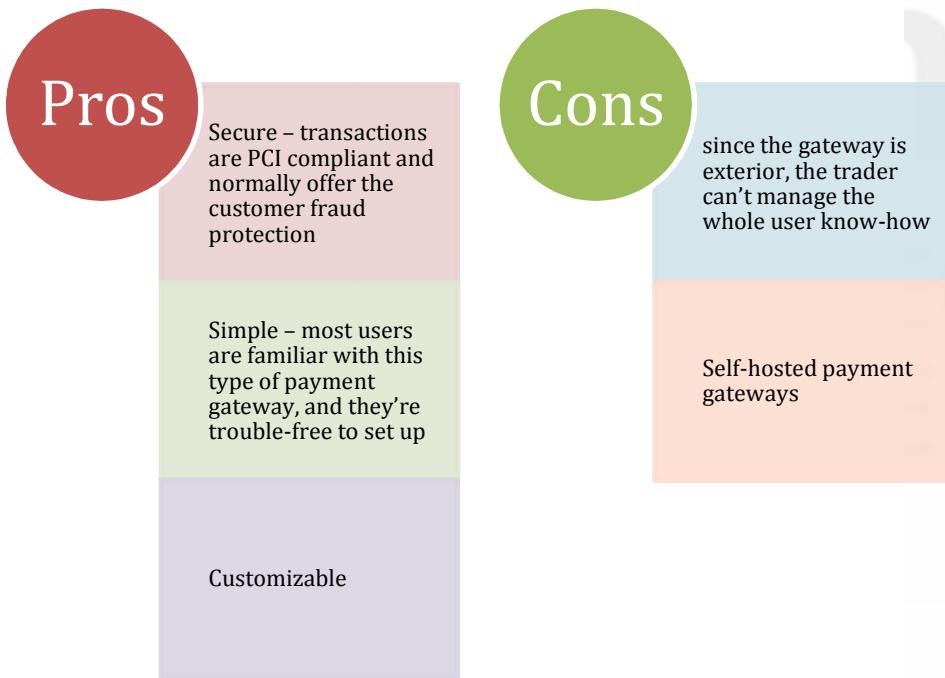


Fig 5.8: Pros and Cons of Hosted Payment Gateways

With this category of gateway, payment details are composed from the customer within the merchant's website. After the details are requested, the collected data is sent to the payment gateway's URL. Some gateways require the payment data be provided in a precise format

5.7.2 Self-Hosted Payment Gateways

With self hosted payment gateways anyone can customise and add new features depending on the business needs and requirements

Pros:

- Good customer experience – the entire transaction is completed in one place.
- Customizable flow – the merchant has control over the payment journey.

Cons:

- No support system- Usually self-hosted gateways do not have a technical support team that you can rely on if the system fails. You would have to figure out how to resolve the problem on your own or hire a professional which could be costly.

5.7.3 API Hosted Payment Gateways

With API hosted payment gateways, customers enter their credit or debit card information directly on the merchant's checkout page and payments are processed using an API (Application Programming Interface) or HTTPS queries.

Pros:

- Customizable – offers full control over the customer experience and UI of the payment journey.
- Capable of integration – can be used with mobile devices, tablets, etc.

Cons:

- Security – merchants are responsible for PCI DSS compliance and purchasing SSL certification.

5.7.4 Local Bank Integration Gateways

Local bank integration gateways redirect the customer to the payment gateway's website (the bank's website) where they enter their payment details and contact details. After making the payment, the customer is redirected back to the merchant website, with payment notification data sent upon redirection.

Pros:

- Quick and easy set up – good for small businesses who need a simple one-time payment structure.

Cons:

- Basic features only – usually doesn't enable returns or recurring payments, so not ideal for wholesalers.

The payment gateway the choose should be dependent on its model, the types of features required, and the amount of control over the business want customers' payment experience.

For online businesses and wholesalers especially, a self-hosted payment gateway offers the most streamlined experience because it allows the customer to complete the transaction from a single page, and offers the

merchant control over the customer experience. And, with QuickBooks Commerce's B2B Payments, you can also have peace of mind that all customer data is protected.

5.8 TYPES OF PAYMENT METHODS

There are various types of payment gateways consumers are using. It can be possible in brick-and-mortar which we usually call physical stores and shopping online which we call click-and-mortar stores. In physical stores, payment gateways consist of the point of sale (POS) terminals used to accept payments by card or by phone. In online stores, payment gateways are the “checkout” portals used to enter credit card information or credentials for services such as Google Pay, Amazon Pay, Facebook Pay and WhatsApp Pay. Using multiple gateways make great business sense when you considering the flexibility it gives to your team. There are various kinds of E-payment present in a market, some are mentioned below:

- Automated clearing house.
- Wire transfers.
- Item processing.
- Remote deposit capture.
- FedLine Access Solutions.
- Automated Teller Machines.
- Card Services (ATM, credit, debit, prepaid)
- Mobile payments
- Crypto currency

On the other hand E-payment methods could be further classified into two areas, credit payment systems and cash payment systems which we usually called Pre Paid & Post Paid E-Payment System.

Prepaid refers to the scheme in which you buy credit in advance before availing services. Postpaid is defined as a scheme in which the customers are billed at the end of the month for the services availed by them. Examples include plastic card, on-line transactions, concerned bank, performed by phones or by filling form on the website, Cyber Cash, encrypted payment, Internet Cheques, cheques for deposit, Process them internally, and clear and settle between banks, cheques handwriting signatures.

5.8.1 Credit Cards

Credit card is a plastic card which is issued by a bank. It is issued to customers of high credit ranking, the necessary information is stored in magnetic form on the card. A card holder can purchase the item from the shop or the showrooms and need not pay cash. He has to flash the card in machine at the place where he is making purchases. Banks issue credit card to the customers up to a certain limit. The customers can purchase goods/services from the authorized showrooms without carrying physical cash with them. The bills are presented by the showroom to the authorized branch. This bill is presented by the paying branch to the issuing branch.

Issuing branch informs the customer about the debit. Banks take nominal charges for credit cards.

5.8.2 Cyber Cash

Unlike Credit card, Cyber Cash is not directly involved in handling funds. In Cyber cash system, after deciding what is to be purchased the customer makes payment to the merchant through credit card without disclosing the credit card number to him. The credit card number is sent to the merchant in encrypted form. The merchant forward the encrypted payment with his private key to the bank's Cyber Cash gateway server. The bank's Cyber Cash gateway server decrypts the information, processes the transaction and forward it to the merchant's bank.

It is basically a form of the e-payment system which requires the use of the card issued by a financial institute to the cardholder for making payments online or through an electronic device, without the use of cash.

5.8.3 Internet Cheques

A cheque is a signed paper document that orders the signer's bank to pay an amount of money to a person specified on the cheque or bearer from the signer's account on or after a specified date. Cheques pass directly from the payer to the payee, so that the timing or the purpose of the payment is clear to the payee. The payee can deposit the cheque in an account of his choice or cash it. Banks operate extensive facilities to accept cheques for deposit Process them internally and clear and settle between banks.

5.8.4 Smart card

It is a plastic card with a microprocessor that can be loaded with funds to make transactions; also known as a chip card.

5.8.5 Cash Payment System

- A. **Direct debit** — A financial transaction in which the account holder instructs the bank to collect a specific amount of money from his account electronically to pay for goods or services.
- B. **E-check** — It is a digital version of an old paper check. It's an electronic transfer of money from a bank account, usually checking account, without the use of the paper check.
- C. **E-cash** – It is a form of an electronic payment system, where a certain amount of money is stored on a client's device and made accessible for online transactions.
- D. **Stored-value card** — A card with a certain amount of money that can be used to perform the transaction in the issuer store. A typical example of stored-value cards are gift cards.

5.8.6 E-wallet

It is clear that mobile wallets are slowly making a mark as a form of payment method, but cash still remains to be an imperative necessity for consumers

life. Experts from different sectors including network operations, banks, express that, mobile payments will quickly replace traditional wallets over time. Recent studies show that consumers' awareness has increased mobile payment usage. E-Wallets a form of prepaid account that stores user's financial data, like debit and credit card information to make an online transaction easier. There are various kinds of wallets.

The Reserve Bank of India has three categories for wallets—closed, semi-closed and open. A closed wallet can be used to buy goods and services exclusively from one company. Semi-closed wallets, on the other hand, can be used to buy goods and services, including financial services, at specified merchant locations, which have a specific contract with the issuer to accept the payment instruments. Open wallets can, however, be used for purchase of goods and services, including at merchant locations or point of sale terminals that accept cards, and also for cash withdrawal at ATMs or from business correspondents. These wallets can only be issued by banks. Money can be added using Net banking, and credit or debit cards. Prepaid wallets have transaction limits and validity periods.

There are various kinds of wallet it could be either a prepaid or postpaid for an example. There is a semi-closed prepaid wallet which can be used to transfer money to other wallet users and bank accounts, anytime, anywhere. We are presenting a comparative view about these wallets omnipresent in a scenario.

Table:5.1:Comparative view about these wallets

Sl. No	Name of a Wallet	Founded & Launched	Characteristics	Modus Operandi	Appearances
1.	Google Pay	September 11, 2015; 5 years ago (as Android Pay) January 8, 2018 (as Google Pay)	Google Pay is a digital wallet platform and online payment system developed by Google. Google Pay is a safe, simple, and helpful way to manage your money, giving you a clearer picture of your spending and savings:	It has features of power in-app and tap-to-pay purchases on mobile devices, enabling users to make payments with Android phones, tablets or watches. Users in the United States and India can also use an iOS device, albeit with limited functionality. Google Pay is directly connected to your bank account and your registered phone number. This helps you save time that you would rather spend on reloading wallets and doing additional KYC which is generally required for other digital wallets in India.	

E-Payment System

Sl. No	Name of a Wallet	Founded & Launched	Characteristics	Modus Operandi	Appearances
2.	Amazon Pay	Launched in 2007	Amazon Pay is an online payments processing service that is owned by Amazon.	Amazon Pay uses the consumer base of Amazon.com and focuses on giving users the option to pay with their Amazon accounts on external merchant websites	
3.	WhatsApp Pay	Launched in February 2018 in India as part of a trial run	Designed in partnership with NPCI, WhatsApp Pay is an in-chat payment feature that allows users to make transactions via WhatsApp to their contact list.	WhatsApp Pay allows users to send money only to their contacts after which it enables UPI ID. WhatsApp Pay users can enter the UPI ID and send money. Through QR code, WhatsApp users can also send money to people who are not in their contact list.	
4.	BHIM	BHIM has been conceived and launched by the Hon'ble Prime Minister of India, Narendra Modi on 30th December 2016 to bring in Financial Inclusion to the nation and a digitally empowered society	This digital wallet is backed by the Reserve Bank of India (RBI) and launched by The National Payments Corporation of India. BHIM is probably one of the best digital wallets in India based on UPI	BHIM lets you send and receive money using Virtual Payment Address (VPA) wherein you can transact without disclosing your bank details. Consequently, it also allows merchants to transact with customers by using fingerprint scanner which is obtained through the Aadhaar database. BHIM enables QR code scan-and-pay option. Likewise, you can generate your own unique UPI PIN and QR code through the app. Also, you don't need to worry about security issues as your login expires after 90 seconds of inactivity to minimize inappropriate and fraudulent use of your data. Additionally, BHIM also provides you a transaction history to make sure that you keep a check on your transactions through the app	

Sl. No	Name of a Wallet	Founded & Launched	Characteristics	Modus Operandi	Appearances	E-payment
5.	Facebook Pay	Facebook was initially incorporated as a Florida LLC. For the first few months after its launch in February 2004, the costs for the website operations for thefacebook.com were paid for by Mark Zuckerberg and Eduardo Saverin, who had taken equity stakes in the company.	Facebook has formally stepped into the digital payments space by launching Facebook Pay in the US. The platform will allow users to make payments across Facebook and Messenger and the company says Facebook Pay will also be expanded to Instagram and WhatsApp in the future. Facebook Pay is a seamless and secure way to make payments on Facebook,	Facebook Pay is available to make payments and purchases on apps, instead of having to re-enter your payment information each time. Facebook never holds the money, though the receiver's bank will usually take a few days to make the funds available as is standard. Get real-time customer support via live chat in the US (and in more places around the world in the future)		
6.	PayZapp	HDFC Bank launched PayZapp on June 10, 2015, to the customers	PayZapp a mobile payment app by HDFC Bank	The HDFC PayZapp e-wallet app is protected with a two-step encryption-based authentication process which helps the users to make payments instantly be it for booking movie tickets or for recharging their mobile numbers or paying utility bills or buy groceries or pay for hotel bills or pay for DTH or make payment for data card or transfer of money to others and so on. PayZapp conducts three security checks for each transaction by using proprietary technology		
7.	PayTM Wallet	Founded on August 2010	Paytm Wallet — a secure digital wallet that lets you manage your money with a touch; pay bills, make recharges, send money to friends & pay for purchases across various brands	Paytm follows PCI DSS compliant in terms of security. It never stores customer's CVV number to ensure their Credit and Debit Card details are completely safe.		

E-Payment System

Sl. No	Name of a Wallet	Founded & Launched	Characteristics	Modus Operandi	Appearances
8.	PhonePe	PhonePe was founded in December 2015, by Sameer Nigam, Rahul Chari and Burzin Engineer. The PhonePe app, based on the Unified Payments Interface, went live in August 2016	The company was acquired by Flipkart in 2016 and it was rebranded as PhonePe wallet. Within 3 months of launch, the app was downloaded by over 10 million users. In 2018, PhonePe also became the fastest Indian payment app to get a 50 million badge on the Google play store	The PhonePe app is based on the Unified Payment Interface (UPI) platform. UPI payment system allows money transfer between any two bank accounts by using a smartphone.	 PhonePe
9.	Jio Money	Started its operations during 2018, is headquartered in Navi Mumbai, India. JioMoney was started as a joint venture between the Reliance Industries and State Bank of India, with a stake ratio of 70:30.	JioMoney is a safe and secure way to make digital payments across physical and online channels. Securely store all your credit/debit cards and bank accounts for convenient and faster payments. Make in-store and online payments across a variety of merchants. Transfer funds to other JioMoney users and to bank accounts.	The payments bank is a special category of banks which can accept deposits and can make payments but are not entitled to issue a loan or other form of credits including the credit cards. The unique feature of JioMoney lies in the fact that payments at the Reliance Outlets be it Reliance Fresh, Reliance Trends, Reliance Jewels and others can be done using this wallet. The app also allows its users to transfer the JioMoney balance to the respective bank account.	 JioMoney
10.	Alipay	Established in Hangzhou, China in February 2004 by Alibaba Group and its founder Jack Ma. In 2015.	Alipay is a third-party mobile and online payment platform.	Alipay Wallet, which also includes a mobile app that allows customers to conduct transactions directly from their mobile devices. Alipay is a must-have payment method for any business looking to reach a critical mass of Chinese shoppers both home and abroad.	 Alipay

Sl. No	Name of a Wallet	Founded & Launched	Characteristics	Modus Operandi	Appearances
11.	Apple pay	Initial release date: October 2014	Apple Pay is a mobile payment and digital wallet service by Apple Inc. that allows users to make payments in person, in iOS apps, and on the web using Safari. It is supported on the iPhone, Apple Watch, iPad, and Mac	Apple Pay is a contactless payment technology for Apple devices. It was designed to move consumers away from physical wallets into a world where your debit and credit cards are on your iPhone or Apple Watch, allowing you to pay using your device instead of a card. Apple customers in the US can use Apple Pay to send and receive money with friends and family quickly, easily and securely. Apple Watch users can now simply ask Siri to pay someone. Apple Pay is now the simplest and most convenient way to make person to person payments on iPhone, iPad and Apple Watch	

Source: BCOS-184: E-commerce (B.Com) SOMS, IGNOU © 2021. All logo vested with a respective company and will be used for academic learning only

5.8.7 Crypto Currencies

Crypto currencies are rapidly gaining interest as a payment method for online transactions, particularly among young, moneyed professionals with IT expertise.

5.9 REQUIREMENT METRICS OF A PAYMENT SYSTEM

- Security:** Security is a massive cause of concern when payments become digital in nature. Right from the need to being able to assure that personal information would not compromise and that their money is in safe hands.
- User Experience:** Companies are taking user experience seriously, and quite a few of them are innovatively redesigning crucial interfaces. Although when a product or application is first launched, the emphasis may be on the reception of the overall idea, over time, it has been tested and proved that applications with a great user experience can launch the business to a whole new platform.

3. **Functionality:** Functional testing comprises of functionality testing, which is a feature validation of an entire function or component of the product. Software testing organizations are providing end-to-end test coverage, ranging right from the requirements-gathering stage, in order to ensure that the defect rates are reduced.
4. **Performance:** Performance testing is undoubtedly crucial. Right from monitoring the response time of the application, to ensuring that the load and stress testing are done, performance testing is necessary to gauge that overall, the app will respond like it has been intended to. It is important to be able to appropriately determine the finest approach and best methodology for performance testing and its subsequent validation.
5. **Data Integrity:** Compromising such data can have disastrous consequence, and banking organizations must take care to never be at the receiving end of such a disaster.

Check Your Progress B

1. Fill in the blanks with appropriate words:
 - i) payment gateways direct the customer away from the site's checkout page.
 - ii) gateways redirect the customer to the payment gateway's website (the bank's website) where they enter their payment details and contact details.
 - iii) refers to the scheme in which you buy credit in advance before availing services.
 - iv) Banks takes nominal charges for
 - v) Reserve Bank of India has classified E-wallets into categories.
2. State whether the following are true or false.
 - i) Ecommerce payment gateways are used to handle payment transaction services through a secured gateway to make a payment for the customer orders.
 - ii) PayPal is an example of API hosted payment gateways.
 - iii) The payment gateway you choose should be independent on your business model.
 - iv) Using multiple gateways makes great business sense when you consider the flexibility it gives your team.
 - v) A typical example of stored-value cards are gift cards.
3. What are the benefits of API hosted payment gateways?

4. What do you mean by cyber cash?

.....
.....
.....
.....
.....

5.10 MERITS OF E-PAYMENT SYSTEM

E-payment systems are made to facilitate the acceptance of electronic payments for online transactions. With the growing popularity of online shopping, e-payment systems became a must for online consumers — to make shopping and banking more convenient. It comes with many benefits, such as:

- Reaching **more clients** from all over the world, this result in more sales.
- More **effective and efficient transactions** — It's because transactions are made in seconds (with one-click), without wasting customer's time. It comes with speed and simplicity.
- **Convenience.** Customers can pay for items on an e-commerce website at anytime and anywhere. They just need an internet connected device. As simple as that!
- **Lower transaction cost** and decreased technology costs.
- **Expenses control for customers**, as they can always check their virtual account where they can find the transaction history.
- Today it's **easy to add payments to a website**, so even a non-technical person may implement it in minutes and start processing online payments.
- Payment gateways and payment providers offer highly **effective security and anti-fraud tools** to make transactions reliable.

5.11 RISKS INVOLVED IN E-PAYMENT

E-commerce **fraud** is growing at a pace of 30% per year. If a merchant follow the security rules, there shouldn't be such problems, but when a merchant chooses a payment system which is not highly secure, there is a risk of sensitive data breach which may cause identity theft.

The lack of anonymity — for most, it's not a problem at all, but you need to remember that some of your personal data is stored in the database of the payment system.

The need for internet access — as you may guess, if the internet connection fails, it's impossible to complete a transaction, get to your online account, etc.

E-commerce, as well as m-commerce, is getting bigger year after year, so having an e-payment system in your online store is a must. It's simple, fast and convenient, so why not have one?

Still, one of the most popular payment methods are credit and debit card payments, but people also choose some alternatives or local payment methods. If you run an online business, find out what your target audience needs and provide the most convenient and relevant e-payment system.

5.12 LET US SUM-UP

The term electronic payment refers to a payment made from one bank account to another using electronic methods and forgoing the direct intervention of bank employees. Barely defined electronic payment refers to e-commerce a payment for buying and selling goods or services offered through the Internet, or broadly to any nature of electronic funds transfer.

The basic characteristics of e-payment system are applicability, ease of use, security, reliability, trust, scalability, convertibility, interoperability, efficiency, anonymity, traceability, and authorization type.

Payment gateway is essentially a bridge or connection pathway between your customers and the relevant financial institution. Gateways are a link between the merchant's website and a payment provider or banking network. Essentially, they act as a "wire" that connects your site to a payment provider and allows secure payment data to flow back and forth. It plays the role of a third party that securely transfers your money from the bank account to the merchant's payment portal.

Once a credit card's testimonials has penetrated into the payment section of an e-Commerce website, the payment gateway encrypts the perceptive details of the card to check both the consumer and the merchant from fraudulent activity as the information is passed between the two during their transaction. The payment gateway then routes that information to the merchant's issuing bank for authorization, and then consequently notifies the merchant of the transaction's status (authorized or declined). Last but not least, the payment gateway settles funds with the merchant after the issuing bank settles the funds with the gateway.

There are four simple steps in the payment gateway process namely; collection, authentication, authorization and settlement.

There are various types of payment gateways such as Hosted payment gateways, Self-Hosted Payment Gateways, API hosted payment gateways and Local bank integration gateways.

There are various types of payment gateways consumers are using. It can be possible in brick-and-mortar which we usually called a physical stores and shopping online which we called click-and-mortar stores. In physical stores,

payment gateways consist of the point of sale (POS) terminals used to accept payments by card or by phone. In online stores, payment gateways are the “checkout” portals used to enter credit card information or credentials for services such as Google Pay, Amazon Pay, Facebook Pay and WhatsApp Pay.

There are various methods of E-payments. Examples of payment methods include plastic card, on-line transactions, concerned bank, performed by phones or by filling form on the website, Cyber Cash, encrypted payment, Internet Cheques, cheques for deposit, Process them internally, and clear and settle between banks, cheques hand writing signatures.

5.13 KEYWORDS

Electronic Payment: It refers to a payment made from one bank account to another using electronic methods and forgoing the direct intervention of bank employees.

Payment Gateway: It is an online application (characteristically used in e-Commerce) that conducts payment authorizations for merchants, electronically based businesses (e-businesses), merchants with mutually brick and mortar locations and online locations and merchants with long-established brick and mortar stores.

Prepaid e-payment system: It refers to the scheme in which you buy credit in advance before availing services.

Postpaid e-payment system: It is defined as a scheme in which the customers are billed at the end of the month for the services availed by them.

Hosted payment gateway: It directs the customer away from the site’s checkout page. When the customer clicks the gateway link, they are redirected to the Payment Service Provider (PSP) page.

Cyber Cash: In Cyber cash system, after deciding what is to be purchased the customer makes payment to the merchant through credit card without disclosing the credit card number to him.

Smart card: It is a plastic card with a microprocessor that can be loaded with funds to make transactions; also known as a chip card.

Credit card: It is plastic card which is issued by a bank. It is issued to customers of high credit ranking the necessary information is stored in magnetic form on the card.

5.14 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A.

1. (i) Automated Clearing House (ii) Traditional payment; E-payment
(iii) digital circulation (iv) point of sale (v) acquirer
2. (i) True (ii) False (iii) True (iv) True (v) False

Check Your Progress B

1. (i) Hosted (ii) Local bank integration (iii) Prepaid payment system
(iv) credit cards (v) three
2. (i) True (ii) False (iii) False (iv) True (v) True

5.15 TERMINAL QUESTIONS

1. Define Electronic Payment System
2. State the difference between traditional payment and e- payment.
3. What are the key players in payment gateways?
4. Explain the steps in payment gateway process.
5. What are the merits of E-payment system?
6. What are Requirements Metrics of a Payment System?
7. State the three categories of E-Wallets.
8. Explain the different types of E-payment system.

**Note**

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 6 E-BANKING

Structure

- 6.0 Objectives
- 6.1 Introduction
- 6.2 Concept of E-Banking
- 6.3 Importance of E-Banking
- 6.4 Technology used in Banking
- 6.5 EFT (Electronic Fund Transfer)
 - 6.5.1 NEFT (National Electronic Fund Transfer)
 - 6.5.2 RTGS (Real Time Gross Settlement)
 - 6.5.3 IMPS (Immediate Payment Service)
 - 6.5.4 UPI (Unified Payments Interface)
 - 6.5.5 Difference between NEFT, RTGS & IMPS
- 6.6 Virtual Currency
- 6.7 Automated Clearing House
- 6.8 Automated Ledger Posting
- 6.9 Distributed Ledger Technology
- 6.10 Let Us Sum Up
- 6.11 Key Words
- 6.12 Terminal Questions

6.0 OBJECTIVES

After studying this unit, you should be able to:

- to explain the meaning of E-Banking;
- to distinguish between the commonly used tools for Electronic Fund Transfer;
- to discuss the need for technology in banking; and
- to understand and appreciate the various technology led developments in the Banking Industry.

6.1 INTRODUCTION

Electronic banking is a form of banking in which funds are transferred through an exchange of electronic signals rather than through an exchange of cash, checks, or other types of paper documents. It is also known as electronic funds transfer (EFT) and basically uses electronic means to transfer funds directly from one account to another. Internet banking is a financial institution with no physical branches; everything is completed online. There is no ability to cash a check, deposit cash and or coinage and such. Online banking is the ability to access account information,

make transfers, set up automatic payments and such via the Internet. Internet banking typically is an electronic payment system, that allows the bank account holder to execute the monetary transaction, such as bill payments, fund transfer, stop payment, balance enquiries, etc. anytime and anywhere using the bank's website. Online banking is part and parcel of the core banking system handled by the bank.

6.2 CONCEPT OF E-BANKING

Privatization and globalization of banks led to huge competition among established and the new banks. The banks increased the number of services offered to include insurance, pension funds, mutual funds, money market accounts, loans and credit plus securities. They were encouraged to explore other financial instruments while at the same time offering more convenience to customers to do any-time banking. The culmination of financial innovations in banking over the past decade triggered a major shift away from the traditional banking model to a new digital banking one.

For consumers, one of the biggest drivers of satisfaction has always been the ease to do business. One of the key reasons for customers switching banks has always been "Not happy with the services". This need led to the origin of the concept of E banking which primarily means banking anytime, anywhere. Digitization has ushered a new era for financial services. It has contributed to the banks entering a period of unprecedented disruptions, in part because financial services innovations have contributed to a completely new way in which customers can bank through the increased mass adoption of mobile technology to the digitization of cash. The concept of E banking has redefined a banking model that had been unchanged for decades resulting in established banks being forced to increase their pace of digital adoption as well as drastically reduce their overheads through cost cutting measures like cutting the number of bank branches in which they operate. In order to stay competitive in today's marketplace, banks and other financial institutions have expanded the range of services that they offer. These services can be divided into four main categories:

- Savings
- Payment services
- Borrowing
- Other financial services

6.3 IMPORTANCE OF E-BANKING

E-banking is a service provided by banks that enables a customer to conduct banking transactions, such as checking accounts, applying for loans or paying bills over the internet using a personal computer, mobile telephone or handheld computer. It includes a range of services like Electronic Funds Transfer (EFT), Automated Teller Machine (ATM), Electronic Data Interchange (EDI), Credit Cards and Electronic or Digital Cash. E-banking has certain advantages over the traditional banking system, as stated below:

- It provides 24 hours, 365 days a year services to the customers of the bank.
- It lowers the transaction cost.
- It inculcates a sense of financial discipline and promotes transparency.
- Customers can make the transactions from office, home or while travelling via cellular phones.

E-Banking through electronic systems continues to expand. While most traditional financial institutions offer online banking services, Web-only banks have also become strong competitors. For example, E^{*}Trade Bank operates online while also providing customers with access to ATMs. These “e-banks” and “e-branches” provide nearly every needed financial service like: Obtain cash, check account balance, Transfer funds, Direct Deposits, Preauthorized payments of bills, cards, rents etc. Unquestionably, many more of these types of financial innovations will be created over the coming years to try to win customers by switching their accounts. However, the extent of how far this innovation can be developed is still not known precisely and for digital banking firms to continue their rapid growth will ultimately be bound to the reliability of new technology advancements and their performance will be directly affected either positively or negatively by this.

6.4 TECHNOLOGY USED IN BANKING

Yesterday technology is no more a technology vis-a-vis the banking industry but has become a basic prerequisite as an obligatory function to run a bank. For many years retail banks have been secure, highly profitable businesses. However, recent industry disruption has been knocking at the industry much more than before. The turning point was the global financial crisis experienced between 2007 and 2009 which not only led to large losses but also shook the trust of the financial customers worldwide. These factors combined with the fact that banking has been relatively undisturbed for centuries, meant it was time for change, and the change has been the rapid use of technology in all spheres of banking. Over the past decade financial service innovations have contributed to a completely new way in which customers can bank, threatening the status quo of traditional retail banks, and redefining a banking model which has been in place for generations. These new technological advancements have facilitated the rapid emergence of digital banking firms and FinTech companies like Paytm, PhonePe, MobiKwik, PayU, ETMoney, PolicyBazaar leading to established banks being forced to swiftly increase their pace of digital adoption to stay relevant and stop mass client attrition to these agile financial start-ups.

With cash being overtaken by card payments for the first time and enhancement in technology now at the forefront, digital banking is gaining importance among financial customers to properly manage their finances. This may seem counterintuitive but technology has in fact allowed us to have a closer relationship with our bank than ever before and has become an evolving area. Mobile banking, check imaging and smartwatches are some of the latest technology related financial innovations assisting customers with a

variety of ways in which to spend move and manage their money. Almost all banks have introduced Core Banking Solutions for their day-to-day operations. As such, banks are using the technology for Back end operations such as Analytics, Data storage and retrieval, Customer Relationship management (CRM), advances processing, report generation and decision making process.

Banking online and through electronic systems continues to expand. While most traditional financial institutions offer online banking services, Web-only banks have also become strong competitors.

6.5 EFT (ELECTRONIC FUND TRANSFER)

Electronic funds transfer (EFT) is an electronic method for transferring funds from one account to another either within a financial institution or across multiple institutions, by using computer-based systems, without the direct intervention of bank staff. Examples of EFT include receiving cash out of an ATM and then placing a stock buy order by using the telephone. Electronic payments are becoming more popular these days as they allow users to transfer funds by various online modes and eliminate any sort of geographical barriers. The ease of transferring money online helps in making most out of online banking services. For transferring money, banks provide multiple options based on various factors and needs of the customers, few of them are National Electronic Funds Transfer (NEFT), Real Time Gross Settlement (RTGS), Immediate Payment Service (IMPS), etc. Based on the value or speed of the transfer, service availability, and other factors, each mode of transfer has different kinds of features and flexibility as well as their own advantages and disadvantages. Moreover, many banks have their own digital wallets to facilitate additional methods of fund transfers online.

Out of various modes for online fund transfer digital wallets, UPI, etc. NEFT, RTGS, and IMPS are typically the most popular. In order to initiate a fund transfer, the originator or remitter (individual transferring the money), is required to have the basic account details of the beneficiary (to whom the money is being transferred) such as the account number, name on the account, IFSC , and the branch name etc. It is the originator who is considered responsible for ensuring the correctness of the account details used for a transfer of funds. Before understanding the various types of fund transfer methods, it is essential to learn the basic factors that are involved in each of the payment systems as explained below. These important factors distinguish the online fund transfer methods on various parameters:

1. **Fund Value:** The fund value is essential in determining which of the transfer methods are available for you. Depending on the value of the fund, the originator can choose a particular method. Moreover, for a newly registered beneficiary, a limited amount of funds is allowed to be transferred.
2. **Timings (service availability):** There are certain methods of fund transfer that allows 24/7 online transfers while other have specified timings. The latter will allow a remitter to initiate a fund transfer any

time of the day but the funds will settle only during the availability of the service. There are certain types of fund transfer methods that are not available during the weekend and public holidays while others operate round the clock throughout the year.

3. **Fund Settlement Speed:** After considering the fund value, most often an individual will look into the settlement speed factor. Each of the fund transfer methods come with different speed of fund settlement. Fund settlement speed indicates the amount of time consumed and the speed at which the funds are settled to the beneficiary's account once it's been initiated. In most cases, people largely choose one transfer method over other due to the speed factor, however, a faster settlement speed is bound to attract additional charges.
4. **Charges:** In accordance with the Reserve Bank of India (RBI), banks decide the transaction charges for each of the fund transfer methods. The charges are based on the total value of the fund, settlement speed, and other features/flexibility offered by the bank. Moreover, the government levies an applicable service charge for each fund transfer transaction. Particular bank's website can be referred to obtain the latest list of transaction fees and other charges.
5. **Transaction Limits:** All banking and financial institutions specify transaction limits on most types of banking and financial products. RBI regulates the transaction limits and all other factors of fund transfer through the Board for Regulation and Supervision of Payment and Settlement Systems (BPSS). BPSS is a subcommittee of the Central Board of the RBI and designated for being the highest authority for making policies pertaining to the payment systems in India. Moreover, BPSS is also responsible for supervising all the payment and settlement systems. All the payment and settlement systems in India are regulated under the Payment and Settlement Systems Act, 2007 (PSS Act).

6.5.1 NEFT (National Electronic Fund Transfer)

National Electronic Funds Transfer or NEFT is the most commonly used online payment option to transfer money from one bank account to another. Usually, salary transfers by companies are done using NEFT. The funds are transferred on a deferred settlement basis, which implies that the money is transferred in batches. There is no maximum limit but this depends from one bank to another. For instance, the retail banking limit set by SBI is Rs. 10 lakhs. Based on the amount being transferred the bank can charge an amount from Rs 2.50 to Rs 25. The money can be transferred only during the bank working days. The transactions cannot be completed over the weekends and on bank holidays. It will be completed on the next working day. Thus, instant transactions can't be made using NEFT. Various requirements for conducting an NEFT transfer are:

- Recipient's name
- Recipient's bank name
- Recipients' account number

- IFSC code of the beneficiary bank

6.5.2 RTGS (Real Time Gross Settlement)

Money can be transferred from one bank to another on a real-time basis using Real Time Gross Settlement or RTGS method. There is no maximum transfer limit, but the minimum is Rs. 2 lakhs. The transactions are processed throughout the RTGS business hours. Usually, the amount is remitted within 30-minutes. To be able to transfer money through RTGS, it is required for the sender and the receiver bank branch to be RTGS enabled. It costs a little more than NEFT. But still, it will not cost you more than Rs. 30 for transactions up to Rs. 5 lakhs. The fee varies from one bank to another. Various requirements for conducting a RTGS are:

- Amount to be sent
- Account number of the remitter or sender
- Name of the recipient or beneficiary
- Account number of the beneficiary
- Beneficiary's bank and branch name
- IFSC code of the receiving branch
- Sender to receiver information, if any

6.5.3 IMPS (Immediate Payment Service)

An IMPS sends instant payments. The money is transferred instantaneously through mobile phones using this interbank electronic fund transfer service. You can make the transactions 24x7x365 across banks including all weekends and bank holidays. The money can be transferred using phones, ATMs, Mobile Money Identifier (MMID) and internet banking. The idea is simple to allow users to make payments with the mobile number of the beneficiary. Various requirements for conducting IMPS are:

- MMID of the Recipient
- 7 Digit MMID Number
- MMID of the receiver
- Name of the beneficiary
- Beneficiary's mobile number
- Account Number of the recipient
- IFSC Codes of the beneficiary bank

6.5.4 UPI

Unified Payments Interface is an instant real-time payment system developed by National Payments Corporation of India facilitating inter-bank transactions. The interface is regulated by the Reserve Bank of India and works by instantly transferring funds between two bank accounts on a mobile platform.



UNIFIED PAYMENTS INTERFACE

Source: UPI

Fig 6.1: UPI

Unified Payments Interface is a real time payment system that allows sending or requesting money from one bank account to another. Any UPI client app may be used and multiple bank accounts may be linked to single app. Money can be sent or requested with the following methods:

- Virtual Payment Address (VPA) or UPI ID: Send or request money from/to bank account mapped using VPA.
- Mobile number: Send or request money from/to the bank account mapped using mobile number.
- Account number & IFSC: Send money to the bank account.
- Aadhar: Send money to the bank account mapped using Aadhar number.
- QR code: Send money by QR code which has enclosed VPA, Account number and IFSC or Mobile number.



Fig 6.2: Examples of UPI Apps

6.5.5 Difference between NEFT, RTGS & IMPS

Irrespective of which system is being used, NEFT, RTGS, or IMPS, they function as robust fund transfer methods which allow individuals and businesses to transfer money online from anytime and anywhere in the world. Online transfer methods are subject to availability based on the customer's eligibility and level of access granted by the bank. Additionally, the limits on fund value, timings, settlement speed, and other factors are a part of the online fund transfer method. Currently, NEFT, RTGS, and IMPS are the most popular methods of fund transfer in India, few of the notable differences between these methods are listed below:

Table 6.1: Key Differences between NEFT, RTGS and IMPS

Basis	NEFT	IMPS	RTGS
Speed of settlement	Half hourly	Real-Time	Real-Time
Maximum transfer value	No Limit	INR 200,000	No Limit
Minimum transfer value	No Limit	No Limit	INR 200,000
Charges	No Charges	Charges decided as per the bank for each transaction	No Charges
Timing	24*7, 365 Days	24*7, 365 Days	7 am IST- 5 pm IST (On all working days for banks in India)

Currently, Indians have the access to choose multiple fund transfer methods. The access to latest technology and an increasing demand for online-based service has left no stone unturned. From banking and financial institutions to governing bodies, and private businesses, the immense utilization of latest technology has helped almost everyone to bridge the gap between their customers, partners, vendors, etc. Considering the ever-increasing number of online users in India and all around the world, it is certain and undeniable that people like to transact digitally and prefer to send money online. Online fund transfers are not only fast, efficient, and convenient, but also useful for accounting and documentation purposes. Unlike other methods, online transfers are superior in terms of reliability and the cost factor as well.

Check Your Progress A:

- What are the advantages of E-banking?

.....

.....

.....

3. What are the various constraints of NEFT?
-
-
-
-
-

4. What are the various requirements of IMPS?
-
-
-
-
-

6.6 VIRTUAL CURRENCY

Virtual currency, or virtual money, is a type of unregulated digital currency, which is issued and usually controlled by its developers and used and accepted among the members of a specific virtual community. The term came into existence around 2012, when the European Central Bank (ECB) defined virtual currency to classify types of “digital money in an unregulated environment, issued and controlled by its developers and used as a payment method among members of a specific virtual community,” according to Bitcoin News. Virtual currency can be defined as “an electronic representation of monetary value that may be issued, managed, and controlled by private issuers, developers, or the founding organization”. Such virtual currencies are often represented in terms of tokens and may remain unregulated without a legal tender. The virtual currency is akin to a coupon.

Examples of virtual currencies are frequent flyer programs by various airlines, Microsoft Points, Nintendo Points, Facebook Credits and Amazon Coin etc. RBI has imposed a ban on the sale or purchase of crypto-currency by stating that financial institutions can no longer deal with entities that trade in virtual currencies such as Bitcoin. Along with use by the common public, a virtual currency can have restricted usage, and it may be in circulation only among the members of a specific online community or a virtual group of users who transact online on dedicated networks. Virtual currencies are mostly used for peer-to-peer payments and are finding increasing use for the

purchase of goods and services. The Reserve Bank of India had imposed a ban on crypto currency trading in April 2018 that barred banks and other financial institutions from facilitating “any service in relation to virtual currencies.” Various features of a virtual currency are explained as below:

- Virtual currency is a type of unregulated digital currency that is only available in electronic form.
- It is stored and transacted only through designated software, mobile or computer applications, or through dedicated digital wallets, and the transactions occur over the internet through secure, dedicated networks.
- Virtual currency is considered to be a subset of the digital currency group, which also includes cryptocurrencies, which exist within the Blockchain network.
- It is not controlled by a centralized banking authority.
- Virtual currency is different than digital currency since digital currency is simply currency issued by a bank in digital form.
- Virtual currency is unregulated without a legal tender and therefore experiences dramatic price movements since the only real force behind trading is consumer sentiment.
- Unlike regular money, virtual currency relies on a system of trust and may not be issued by a central bank or other banking regulatory authority. They derive their value based on the underlying mechanism, like mining in cases of cryptocurrencies, or the backing by the underlying asset.

Difference between Digital, Virtual, and Crypto Currencies

Digital currency is the overall superset that includes virtual currency, which in turn includes crypto currencies. Compared to virtual currency, a digital currency covers a larger group that represents monetary assets in digital form. Digital currency can be regulated or unregulated. In the former case, it can be denominated to a sovereign currency that is, a country's central bank can issue a digital form of its fiat currency notes. On the other hand, a virtual currency often remains unregulated and hence constitutes a type of digital currency. Crypto currencies like bitcoin and ethereum are considered to be a part of the virtual currency group. A crypto currency uses cryptography technology that keeps the transactions secure and authentic, and also helps to manage and control the creation of new currency units. Such crypto currencies exist and are transacted over dedicated Blockchain-based networks that are open to the common public. Anyone can join and start transacting in crypto currencies.

6.7 AUTOMATED CLEARING HOUSE

Automated Clearing House (ACH) is a computer-based electronic network that coordinates electronic payments and automated money transfers i.e processes transactions, usually domestic low value payments, between participating financial institutions. ACH is a way to move money between banks without using paper checks, wire transfers, credit card networks, or

cash. ACH and EFT payments are similar in that they are both forms of electronic payments. However, EFT refers to all digital payments, whereas an ACH is a specific type of EFT. An ACH payment occurs when money moves from one bank to another bank. This money moves electronically, through the Automated Clearing House Network. In India National Automated Clearing House, or NACH, introduced by National Payments Corporation of India, is a centralized clearing service that aims at providing interbank high volume, low value transactions that are repetitive and periodic in nature. Most people already use ACH payments, although they might not be familiar with the technical jargon. When employers pay wages through direct deposit or consumers pay bills electronically out of checking accounts, the ACH network is often responsible for those payments. These computerized payments have benefits for both merchants and consumers as explained below:

1. **Lower costs:** ACH payments use fewer resources than traditional paper checks. There's no need for paper, ink, fuel to transport checks, time and labor to handle and deposit checks, and so on.
2. **Recordkeeping Convenience:** Electronic transactions make it easy to keep track of income and expenses. With every transaction, banks create an electronic record. Accounting and personal financial management tools can also access that transaction history.
3. **Convenience:** ACH is more convenient and easier to use as compared to the other methods of payment.
4. **Customer's preference:** ACH is preferred because of security, reduced human error and increase time savings, Faster processing time.

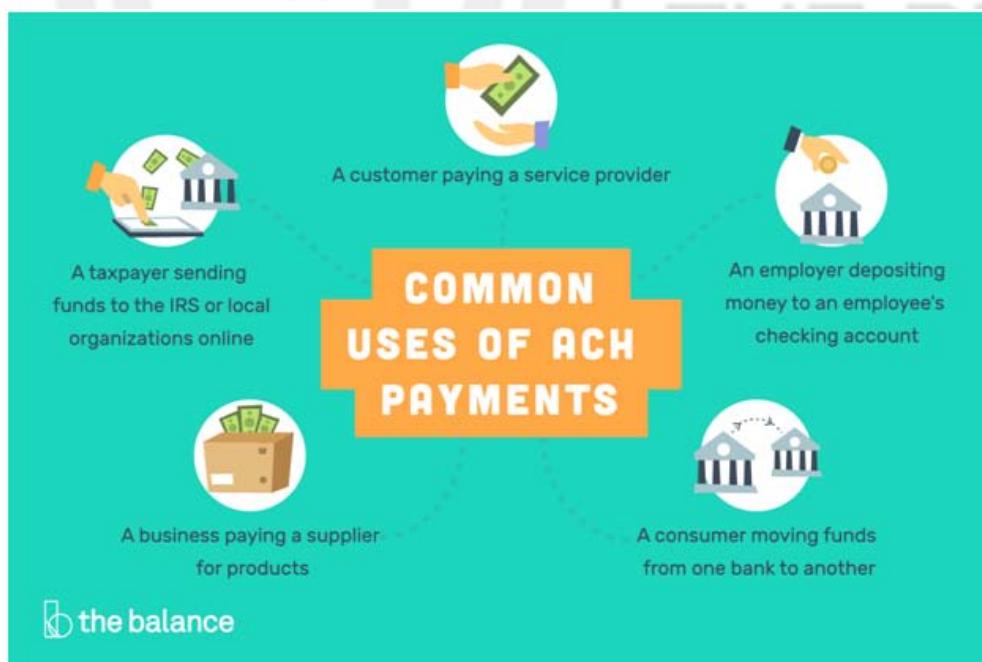


Fig 6.3: Common uses of ACH Payments

To complete payments, the organization requesting a payment (whether they want to send funds or receive funds) needs to get bank account information

from the other party involved. For example, an employer needs the following details from employees to set up direct deposit:

- The name of the bank or credit union receiving funds
- The type of account at that bank (checking or savings)
- The bank's ABA routing number
- The recipient's account number

With that information, payments can be created and routed to the correct account. Billers need those same details to make pre-authorized withdrawals from customer accounts. An originator starts a direct deposit or direct payment transaction using the ACH Network. Originators can be individuals, organizations, or government bodies, and ACH transactions can be either debit or credit. The originator's bank, also known as the originating depository financial institution (ODFI), takes the ACH transaction and batches it together with other ACH transactions to be sent out at regular times throughout the day.

An ACH operator, either the Federal Reserve or a clearing house, receives the batch of ACH transactions from the ODFI with the originator's transaction included. The ACH operator sorts the batch and makes transactions available to the bank or financial institution of the intended recipient, also known as the receiving depository financial institution (RDFI). The recipient's bank account receives the transaction, thus reconciling both accounts and ending the process. ACH payments are often electronic from start to finish. But sometimes merchants convert paper checks to electronic payments, and the funds move through the ACH system. The ACH Network essentially acts as a financial hub and helps people and organizations move money from one bank account to another. ACH transactions consist of direct deposits and direct payments, including B2B transactions, government transactions, and consumer transactions.

6.8 AUTOMATED LEDGER POSTING

Learning to identify anomalies in large-scale accounting data is one of the ancient challenges in financial statement audits or forensic investigations. Nowadays, the majority of applied techniques refer to handcrafted rules derived from known scenarios.



Fig 6.4: Automated Ledger Posting

The financial accounting term posting to the ledger refers to the process of analyzing the credits and debits appearing in journal entries, and recording those transaction amounts in the proper accounts found in the company's general ledger. The process of transferring the entries from journal to respective ledger accounts has been automated coining the term automated ledger posting. The balancing of ledgers is carried out automatically to find out differences at the end of the year. There are certain ways by which the ledger posting is automatically governed.

Artificial intelligence can help accountants to be more productive and efficient. Robotic process automation (RPA) allows machines or AI workers to complete repetitive, time-consuming tasks in business processes such as document analysis and handling that are plentiful in accounting.

Algorithms and Volume of Data

Two factors impact how well an AI platform is designed for accounting are:

1. Algorithms and the sophistication of its technology
2. The amount of data used for testing the technology

For an AI platform to perform exceptionally well, it has to have processed tens of millions of transactions to have a high level of certainty and prediction rate. Very few platforms reach that level since they either need to have a lot of clients or access to massive datasets.

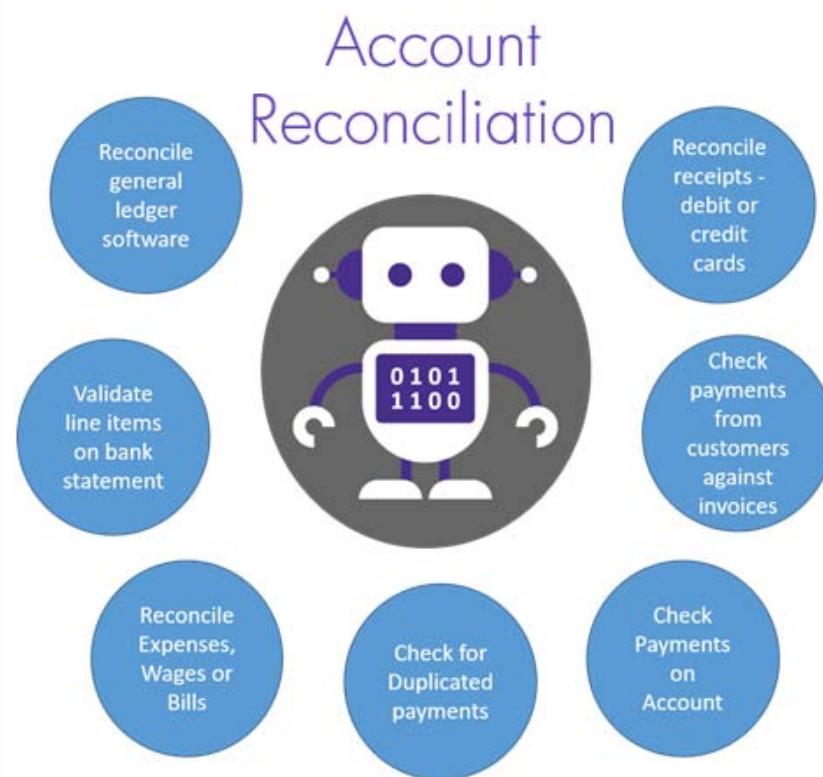


Fig 6.5: Account Reconciliation

AI can prevent these problems because well-trained AI knows everything needed to know about a client (even tracing past trends, if applicable). AI can cut down on data retrieval fatigue and related human input errors by as much as 90%.

6.9 DISTRIBUTED LEDGER TECHNOLOGY

Since ancient times, ledgers have been at the heart of economic transactions, with the purpose of recording contracts, payments, buy-sell deals, or moving assets or property. The journey which began with recording on clay tablets or papyrus made a big leap with the invention of paper. Over the last couple of decades, computers have provided the process of record-keeping and ledger maintenance with great convenience and speed. Today, with innovation, the information stored on computers is moving towards much higher forms, which is cryptographically secure, fast, and decentralized. Companies can take advantage of this technology in many forms, one way being through distributed ledgers.

A distributed ledger can be described as a ledger of any transactions or contracts maintained in decentralized form across different locations and people, eliminating the need for a central authority to keep a check against manipulation. In this manner, a central authority is not needed to authorize or validate any transactions. All the information on the ledger is securely and accurately stored using cryptography and can be accessed using keys and cryptographic signatures. Once the information is stored, it becomes an immutable database, over which the rules of the network are applicable.

Thus a Distributed ledger technology (DLT) is a digital system for recording the transaction of assets in which the transactions details are recorded in multiple places at the same time. Unlike traditional databases, distributed ledgers have no central data store or administration functionality.

A distributed ledger is a database that is consensually shared and synchronized across multiple sites, institutions, or geographies, accessible by multiple people. It allows transactions to have public "witnesses". The participant at each node of the network can access the recordings shared across that network and can own an identical copy of it. Any changes or additions made to the ledger are reflected and copied to all participants in a matter of seconds or minutes. Underlying distributed ledgers is the same technology that is used by block chain, which is the technology that is used by bitcoin. Block chain is a type of distributed ledger used by bitcoin.

Advantages of Distributed Ledgers:

1. While centralized ledgers are prone to cyber-attack, distributed ledgers are inherently harder to attack because all of the distributed copies need to be attacked simultaneously for an attack to be successful. Furthermore, these records are resistant to malicious changes by a single party. By being difficult to manipulate and attack, distributed ledgers allow extensive transparency.
2. Distributed ledgers also reduce operational inefficiencies, speed up the amount of time a transaction takes to complete, are automated, and therefore function 24/7, all of which reduce overall costs for the entities that use them.

3. Distributed ledgers also provide an easy flow of information, which makes an audit trail easy to follow to accountants when they conduct reviews of financial statements. This helps remove the possibility of fraud occurring on the financial books of a company. The reduction in the use of paper is also a benefit to the environment.

Use of Distributed Ledgers:

1. Distributed ledger technology has great potential to revolutionize the way governments, institutions, and corporations work. It can help governments in tax collection, issuance of passports, recording land registries, licenses, and the outlay of Social Security benefits, as well as voting procedures.
2. While the distributed ledger technology has multiple advantages, it's in a nascent stage and is still being explored in how to adopt it in the best possible way. Though one thing is clear, that the future format of centuries-old ledgers is to be decentralized.

Check Your Progress B:

1. State the features of virtual currency.

.....
.....
.....
.....

2. What are the benefits of ACH Payments?

.....
.....
.....
.....

3. What is Automated Ledger Posting?

.....
.....
.....
.....
.....
.....

4. State the advantages of Distributed Ledgers.

.....
.....
.....
.....

6.10 LET US SUM UP

Electronic banking is a form of banking in which funds are transferred through an exchange of electronic signals rather than through an exchange of cash, checks, or other types of paper documents. It is also known as electronic funds transfer (EFT) and basically uses electronic means to transfer funds directly from one account to another. E-banking has certain advantages over the traditional banking system, as it provides 24 hours, 365 days a year services to the customers of the bank; lowers the transaction cost; inculcates a sense of financial discipline and promotes transparency; customers can make the transactions from office, home or while travelling via cellular phones.

For many years' retail banks have been secure, highly profitable businesses. However, recent industry disruption has been knocking at the industry much more than before. The turning point was the global financial crisis experienced between 2007 and 2009 which not only led to large losses but also shook the trust of the financial customers worldwide. These factors combined with the fact that banking has been relatively undisturbed for centuries, meant it was time for change, and the change has been the rapid use of technology in all spheres of banking.

Electronic funds transfer (EFT) is an electronic method for transferring funds from one account to another either within a financial institution or across multiple institutions. National Electronic Funds Transfer or NEFT is the most commonly used online payment option to transfer money from one bank account to another. Usually, salary transfers by companies are done using NEFT. The funds are transferred on a deferred settlement basis, which implies that the money is transferred in batches. Money can be transferred from one bank to another on a real-time basis using Real Time Gross Settlement or RTGS method. There is no maximum transfer limit, but the minimum is Rs. 2 lakhs. The transactions are processed throughout the RTGS business hours. IMPS send instant payments. The money is transferred instantaneously through mobile phones using this interbank electronic fund transfer service. You can make the transactions 24x7x365 across banks including all weekends and bank holidays.

Virtual currency, or virtual money, is a type of unregulated digital currency, which is issued and usually controlled by its developers and used and accepted among the members of a specific virtual community. The virtual currency is akin to a coupon. A virtual currency can have restricted usage, and it may be in circulation only among the members of a specific online community or a virtual group of users who transact online on dedicated networks. Automated Clearing House (ACH) is a computer-based electronic network that coordinates electronic payments and automated money transfers i.e. processes transactions, usually domestic low value payments, between participating financial institutions. ACH is a way to move money between banks without using paper checks, wire transfers, credit card networks, or cash. ACH and EFT payments are similar in that they are both forms of electronic payments.

The financial accounting term posting to the ledger refers to the process of analyzing the credits and debits appearing in journal entries, and recording those transaction amounts in the proper accounts found in the company's general ledger. Distributed ledger technology (DLT) is a digital system for recording the transaction of assets in which the transactions details are recorded in multiple places at the same time. Unlike traditional databases, distributed ledgers have no central data store or administration functionality.

6.11 KEY WORDS

Electronic Banking: E-banking is a form of banking in which funds are transferred through an exchange of electronic signals rather than through an exchange of cash, checks, or other types of paper documents.

IFSC (Indian Financial System Code): IFSC is a unique eleven-digit number which is a combination of alphabets and numerals given to a bank for a specific branch.

NEFT (National Electronic Funds Transfer): NEFT enables an individual electronically transfer funds from any bank branch to any individual having an account with any other bank branch in the country participating in the Scheme.

RTGS (Real Time Gross Settlement): RTGS is an electronic form of funds transfers where the transmission takes place on a real time basis. In India, transfer of funds with RTGS is done for high value transactions, the minimum amount being Rs. 2 lakh. The beneficiary account receives the funds transferred, on a real time basis.

IMPS (Immediate Payment Service): IMPS is an instant payment inter-bank electronic funds transfer system in India. IMPS offer an inter-bank electronic fund transfer service through mobile phones.

Virtual Currency: Virtual currency is termed as an electronic representation of monetary value that may be issued, managed, and controlled by private issuers, developers, or the founding organization.

Automated Clearing House: An automated clearing house is a computer-based electronic network to move money between banks without using paper checks, wire transfers, credit card networks, or cash.

Distributed Ledger Technology: Distributed ledger technology is a ledger of any transactions or contracts maintained in decentralized form across different locations and people, eliminating the need for a central authority to keep a check against manipulation.

6.12 TERMINAL QUESTION

- 1) What all reasons were responsible for the technological innovation in the banking industry?

- 2) What will be the things that need to be consider before initiating an online fund transfer? What all tools will you use?
- 3) What is the difference between NEFT,RTGS and IMPS?
- 4) What is a virtual currency? Why do you think crypto currency was banned by RBI?
- 5) What are the features of a virtual currency?
- 6) What is the difference between ACH and EFT?
- 7) What are the benefits of ACH payments?
- 8) Do you think Distributed Ledger Technology is revolutionizing the world? If so how?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.



BLOCK 3

WEBSITE DEVELOPMENT AND HOSTING

BLOCK 3 WEBSITE DEVELOPMENT AND HOSTING

This is the third block of the course “E-Commerce”. This block is structured to cover the various phases of website development process, web server hardware, web server software and E-commerce software. The block on the theme “Website Development and Hosting” comprises of three units, the detail of which is mentioned below:

- **Unit7:** This unit gives the basic introduction about website development. The unit covers the various aspects related to the websites such as their various types, evolution and usages in everyday life along with the website’s developments process focusing on the various phases of development and briefly stating the various inputs and output of each phase/step. The later part of the unit states various ingredients required for website development as well the various types of website hosting.
- **Unit-8:** This unit discusses the various e- commerce software for mid-sized, large sized and mid to large sized companies. Apart from that the unit also explains various e-commerce initiatives, strategies for developing e-commerce websites as well as the management of e-commerce implementations.
- **Unit-9:** This unit helps the learners in understanding about the basics of web servers, their essentials, various types of web servers and their distinction along with the web server software and application server software.

UNIT 7 WEBSITE DEVELOPMENT

Structure

- 7.0 Objectives
- 7.1 Introduction
- 7.2 Meaning of Website
- 7.3 Evolution of Website
 - 7.3.1 Rapid growth and expansion of WWW and the browsers
- 7.4 Website Usage
- 7.5 HTTP & HTTPS Protocols
 - 7.5.1 HTTP
 - 7.5.2 HTTPS
 - 7.5.3 Difference between HTTP and HTTPS
- 7.6 Types of Website
- 7.7 Development of Website
- 7.8 Ingredients Required for Website Development
- 7.9 Website Hosting
 - 7.9.1 Types of Website Hosting
 - 7.9.2 Website Hosting Alternatives
- 7.10 Let Us Sum Up
- 7.11 Keywords
- 7.12 Terminal Questions

7.0 OBJECTIVES

After studying this unit, you should be able to:

- understand the origination of websites;
- describe website usages;
- explain HTTP and HTTPS Protocols;
- explain the various types of websites;
- describe the process of development of websites over time;
- explain the various ingredients required for website development; and
- explain the concept and various types of web hosting;

7.1 INTRODUCTION

Websites are typically dedicated to a particular topic or purpose, such as news, education, commerce, entertainment, or social networking. Hyper linking between web pages guides the navigation of the site, which often starts with a home page. Users can access websites on a range of devices, including desktops, laptops, tablets, and smart phones. The software application used on these devices is called a web browser. Web development is the building and maintenance of websites. It is basically the work happening behind the scenes to make a website look great, work fast and perform well with a seamless user experience. Website development is done by the web developers by using a variety of coding languages which depends on the type of tasks they are performing and the platforms on which they are working. This unit explains the meaning, origination, usages of websites along with the process and ingredients required for website development.

7.2 MEANING OF WEBSITE

A website is a compilation of web pages and associated content that is acknowledged by a general domain name and published on at least one web server. A website (also known as web site) is a collection of web pages and related content that is identified by a common domain name and published on at least one web server. Notable examples are wikipedia.org, google.com, amazon.com and www.ignou.ac.in. The software application used on these devices is called a web browser. Basically, for a layman a website is a set of data and information about a particular subject which is available on the Internet. Websites can be used in various ways for a number of purposes such as a personal website for someone's own business or profession, a corporate website for a company, a government website for any government organization or any other organizational website, etc. Websites can be the work of an individual, a business or other organization, and are typically dedicated to a particular topic or purpose. Any website can contain a hyperlink to any other website, so the distinction between individual sites, as perceived by the user, can be blurred. For an example below is a snapshot of IGNOU University portal.

Home About IGNOU Register Online Student Support Regional Network Contact Us

ONLINE RE-REGISTRATION JANUARY 2021

APPLY NOW

Re-Registration for January 2021 is open

IGNOU

Results Downloads eGyankosh Podcast Publication

Study at IGNOU Enrolled Students

Gyan Dhara is an internet audio counseling service offered by IGNOU. Students can listen to the live discussions by the teachers and experts on the topic of the day and interact with them through telephone, and through chat mode.

Interaction Timing 11:00 AM to 1:00 PM

Gyan Vani , Delhi can be heard from 8 am to 8 pm Toll Free No: 1800 112 347
Gyan Vani may be accessed on Mobile by using "PUFFIN" browser Tel Phone No: 91-1129533103
91-1129533581

This service can be directly accessed through URL <http://www.ignouonline.ac.in/gyandhara/> Email: gyandhara@ignou.ac.in

www.ignou.ac.in and its subdomains are the only authentic sources of Information of IGNOU ||

Results Downloads eGyankosh Podcast Publication

Source: www.ignou.ac.in

Fig 7.1: Website of IGNOU

The above snapshot depicts that IGNOU is an abbreviation of Indira Gandhi National Open University which is a National Resource Centre for Open and Distance Learning (ODL), with international recognition and presence. It aims to provide seamless access to sustainable and learner-centric quality education, skill up gradation and training to all using innovative technologies. The University is committed to quality teaching, research, training and extension activities, and acts as a national resource centre for expertise and infrastructure in the ODL system. Emphasis is now being laid on developing interactive multimedia and online learning, and adding value to the traditional distance education delivery mode with modern technology-enabled education within the framework of integrated distance and online learning.

7.3 ORIGINATION OF WEBSITE

The development of the World Wide Web (WWW) began in 1989 by Tim Berners-Lee and his colleagues at CERN, an International scientific organization based in Geneva, Switzerland. They created a protocol, Hypertext Transfer Protocol (HTTP), which standardized communication

between servers and clients. Their text-based Web browser was made available for general release in January 1992. CERN announced that the World Wide Web would be free to use by anyone. Before the introduction of the Hypertext Transfer Protocol (HTTP), other protocols such as File Transfer Protocol and the Gopher Protocol were used to retrieve individual files from a server. We will discuss the HTTP and HTTPs in more elaborative manner in later section



Fig 7.2: World Wide Web (WWW)

7.3.1 Rapid Growth and Expansion of WWW with Browsers

The WWW gained rapid acceptance with the creation of a Web browser called Mosaic, which was developed in the United States by Marc Andreessen and others and was released in September 1993. Mosaic allowed people using the Web to use the same sort of “point-and-click” graphical manipulations that was possible in personal computers also. In April 1994, Andreessen co founded Netscape Communications Corporation, whose Netscape Navigator became the dominant Web browser soon after its release in December 1994. By the mid-1990s the World Wide Web had millions of active users.

Table 7.1: Various Software Support Internet Applications

Year of Origin	Internet Application	Logo & Parent Company	Product Mandate
1994	The company's first product was the web browser, called <i>Mosaic Netscape 0.9</i> , released on October 13, 1994. Within four months of its release, it had already taken three-quarters of the browser market	 Netscape Communications Corporation	Netscape web browser was once dominant but lost to Internet Explorer and other competitors in the so-called first browser war, with its market share falling from more than 90 percent in the mid-1990s. Netscape advertised that "the web is for everyone" and stated one of its goals was to "level the playing field" among operating systems by providing a consistent web browsing experience across them.

				Website Development
1995 1996	Internet Explorer (IE), in 1995 as an add-on to the Windows 95 operating system. IE soon became the most popular Web browser	 Microsoft Corporation	Internet Explorer is a series of graphical web browsers developed by Microsoft and included in the Microsoft Windows line of operating systems, starting since 1995. It was first released as part of the add-on package Plus! for Windows 95 that year. IE was integrated into the Windows operating system in 1996 and came “bundled” ready-to-use within the operating system of personal computers.	
2002	Mozilla Firefox, or simply Firefox, is a free and open-source web browser developed by the Mozilla Foundation and its subsidiary, the Mozilla Corporation. Firefox uses the Gecko layout engine to render web pages, which implements current and anticipated web standards	 Mozilla Organization.	Firefox Browser for Android is automatically private and incredibly fast.	
2003 2005 2007	Apple's Safari is the default browser on Macintosh personal computers and later on iPhones (2007) and iPads (2010) Safari 2.0 was the first browser with a privacy mode.	 Apple.	Safari is a graphical web browser developed by Apple, based on the WebKit engine. First released on desktop in 2003 with Mac OS X Panther, a mobile version has been bundled with iOS devices since the iPhone's introduction in 2007.	
2008	Google launched Chrome, the first browser with isolated tabs, which meant that when one tab is crashed, other tabs and the whole browser would still function	 Alphabet Inc.	By 2013 Chrome had become the dominant browser, surpassing IE and Firefox in popularity	
2015	Microsoft discontinued Internet Explorer and replaced it with Edge.	 Microsoft	Microsoft Edge is a cross-platform web browser developed by Microsoft. It was first released for Windows 10 and Xbox One in 2015, then for Android and iOS in 2017, for macOS in 2019, and as a preview for Linux in October 2020. Edge includes integration with Cortana and has extensions hosted on the Microsoft Store.	

Source: Google

For more details about web browsers refer to the unit-3 of BCOS-183: Computer Application in Business which is a 3rd semester course of B.Com (G). In the early 21st century, smart phones became more computer-like, and more-advanced services, such as Internet access, became possible. Web usage on Smartphone steadily increased, and in 2016 it accounted for more than half of Web browsing.

7.4 WEBSITE USAGES

The proliferation of mobile phones has given birth to new categories of web users and expanded the target audience for the businesses, and this all has become possible with the easy access to the internet. Despite the availability of mobile apps, mobile friendly responsive web is gaining popularity and is preferred among the audience. A website provides a quick and easy way of communicating information between buyers and sellers. Websites are useful not only for the customers but also for buyers in many ways. Websites can be tailored according to the hosts requirements. A website can provide much information such as opening hours, contact information, images of location or products and also the AI enabled contact forms to facilitate enquiries from potential customers or to obtain feedback from existing ones. Various usages of websites are explained in detail below:

- 1. Online Presence 24/7:** Website enables customers to contact the service provider anytime, anywhere. Even outside of business hours, website continues to find and secure new customers. 24/7 presence offers the user convenience as the information needed by them can be accessed in their comfortable zones be it either their own home or workplace with no added pressure to buy.
- 2. Information Exchange:** Through a website a seller can provide as much information as he wants and requires for the customers. Websites provide the easiest way of information exchange between the buyer and sellers, which really helps the businesses to engage the customer and sell in an effective and cost-efficient way.
- 3. Credibility:** Having an online presence is imperative on the part of any sort of business these days. It makes them get ahead of their competitors in one way or another. Most of the reputed businesses have their presence in virtual places, which helps in building reputation and improved credibility of the businesses in the eyes of customers. A website can be used for answering all what's and why's of potential customers. Moreover, having a good quality, easy-to-use website makes them believe that they will get the same positive experience in all areas of the business.
- 4. Market Expansion:** Online presence helps in the expansion of the target market, as it can be accessible to anyone all over the world. Anyone, from any country, can easily find the company and as such becomes a potential customer. Online presence actually helps the companies to increase their market share and capitalize by a great extent which otherwise is not possible.
- 5. Consumer Insights:** These days various customers analytic tools such as artificial intelligence, big data help in identifying typical customers, their preferences, demand and behavior towards certain products. The diverse

range of data available also offers hands to the businesses to better understand their potential customers and thus offer them products as per their needs.

6. **Advertising:** Tools like Google Ad Words or advertising on Facebook gives the power to reach customers with much more accuracy and reliability than with traditional offline advertising methods. SEO and online advertising are a great way to help build up awareness and increasing traffic in no time.
7. **Competitors Online:** If any business player do not have a website it is highly likely that their competitors will have. This can lead to missing out on gaining new customers and opportunities to be at the forefront. It is crucial that no opportunity is missed and every prospect is gained by competition. Therefore, to stay ahead of the competition and have a greater market presence it is required by every business to have online presence.
8. **Customer Service Online:** Websites provide an easier and effective way to handle customer service. AI enabled chat boxes can address all the queries immediately which also helps the companies to save the costs of customer representatives. Timely responses to the customer queries help in improving their relationships with the service provider.
9. **Growth Opportunity:** Websites, in general, are great ways to provide a place that potential investors can be referred to. It shows what the company is about, what it has achieved and what it can achieve in the future. Thus, having a website incredibly provides various growth opportunities.

7.5 HTTP & HTTPS PROTOCOL

Every URL link that begins with HTTP uses a basic type of “hypertext transfer protocol”. Which was developed in early 19909's by Tim Berners-Lee. This network protocol enables web browsers and servers to communicate through the exchange of data. Hyper Text Transfer Protocol Secure (HTTPS) is the secure version of HTTP, the protocol over which data is sent between your browser and the website that you are connected to. The 'S' at the end of HTTPS stands for 'Secure'. It means all communications between browser and the website are encrypted. For more details we will study both the terms separately:

7.5.1 HTTP

HTTP is a protocol which allows the fetching of resources, such as HTML documents. It is the foundation of any data exchange on the Web and it is a client-server protocol, which means requests are initiated by the recipient, usually the Web browser. A complete document is reconstructed from the

different sub-documents fetched, for instance text, layout description, images, videos, scripts, and more. It is an application-level protocol for distributed, collaborative, hypermedia information systems.

7.5.2 HTTPs

Hypertext Transfer Protocol Secure is an extension of the Hypertext Transfer Protocol. It is used for secure communication over a computer network, and is widely used on the Internet. In HTTPS, the communication protocol is encrypted using Transport Layer Security or, formerly, Secure Sockets Layer.

7.5.3 Difference between HTTP and HTTPs

HTTP is a protocol using which hypertext is relocated over the Web. Due to its ease, HTTP has been the most commonly used protocol for data transfer over the Web but the data (i.e. hypertext) exchanged using HTTP is not as secure as we would like it to subsist. In precise, by using both the HTTP/HTTPS the information of a particular website is exchanged between Web Server and Web Browser. But what's difference between these two is extra 's' present in HTTPS, Which that makes it secure! The below mentioned table would meticulously provide concise difference between HTTP and HTTPS.

Table 7.3: Difference between HTTP and HTTPs

Basis	HTTP	HTTPs
Definition	It stands for Hyper Text Transfer Protocol	It stands for Hyper Text Transfer Protocol Secure
Encryption	It does not encrypt the text	It encrypt the text so that no one can access it
Usage of SSL	They don't require Secure Socket Layer at Transport layer	They use Secure Socket Layer to encrypt the code
Type	It is a default protocol	It is not a default protocol
Beginning	URL begins with http://	URL begins with https://
Security	It is an unsecure protocol	It is a safe transfer protocol
Validation	It does not require any validation	It requires validation like domain verification
Address bar	It has simple address bar	It has green colored address bar that shows it is secure
Hacking	It can be easily hacked	It cannot be hacked easily

7.6 TYPES OF WEBSITES

As we know that Web hosting is a service that allows organizations and individuals to post a website or web page onto the Internet. Websites are hosted, or stored, on special computers called servers. When Internet users desire to sight the website, all they need to do is to type the website address

or domain name in the browser. The choice of the type of websites depends on the requirement of the seller. Websites can mainly be categorized into four broad categories namely authority website, lead generation website, sales website and utility website explained in detail later. By knowing, what kind of website is needed before making any design or marketing decision, one can save oneself from a world of hurt and waste money and that also helps in attracting the audience they want.

1. **Authority Website:** An authority website is a trusted, reliable source of information. The authority website serves as an online presence for the business. This is the place potential customers can go to see what the company has done and how to get in contact with someone about services and leads are generated offline. People visiting the website already know about the company and reach there to gather more information. Here the website serves as an online placeholder, giving more legitimacy to the business in the eyes of customers. For example: Healthambition.com is a great Authority site in the health sector which has dozens of review articles that compares different products and makes it easy for viewers to buy the recommended products from the affiliate links as shown in the Fig. 7.3 below:



Fig 7.3: Example of Authority Websites

2. **Lead-Generation Website:** As its name suggests, this site is focused on generating leads through its online presence. SEO and targeted marketing strategies play a huge role in bringing in new customers. Sales, however, still occurs offline. These websites are found online by people who have buyer's intent. This means that the prospective customer is basically ready to spend their money and they just need to be convinced that the business is the perfect place to do this spending. For example, Live Chat is online customer service software with online chat, help desk software, and web analytics capabilities which can be used as a tool for lead generation.



The fastest way to help your customer.

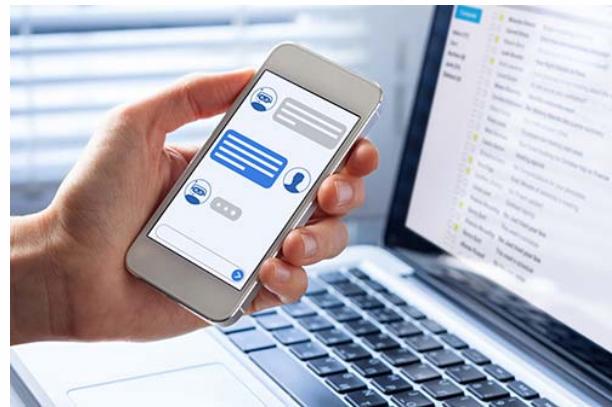


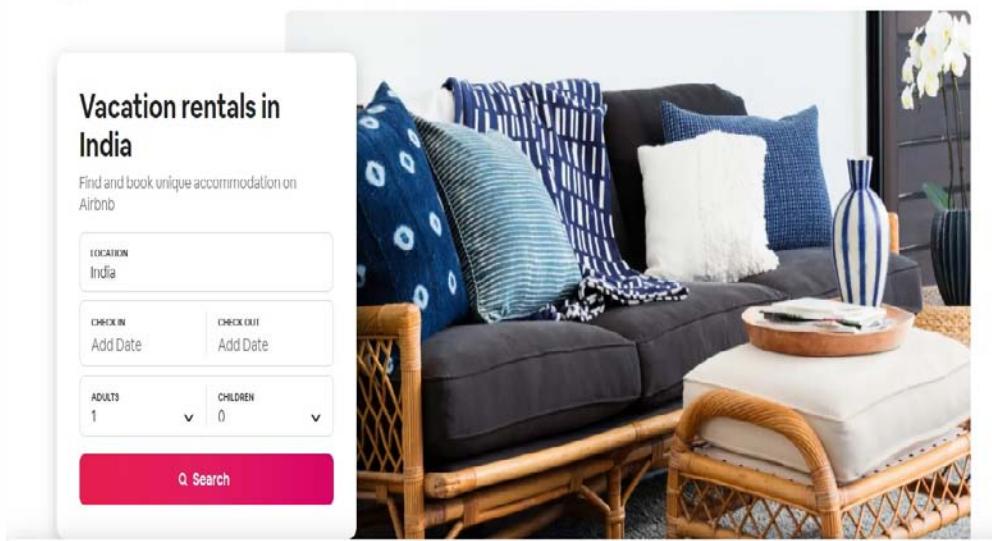
Fig 7.4: Examples of Lead-Generation Websites

3. **Sales Website:** These are the sites that sell products or services through e-commerce. If a site has a cart function, then it falls into the sales website category. This site is especially popular, as both leads and sales are all done completely online. A company's website can still fall into the sales category if that business utilizes online scheduling and payment, but provides the service in-person. For example, Amazon.com, flipkart.com, myntra.com are the sales websites, here customers can buy products and services online as per their needs.



Fig 7.5: Examples of Sales Websites

4. **Utility Website:** A utility website functions more like a tool than a standard website. These are the companies whose business and website are one and the same. Air BNB and Facebook are examples of utility websites. They don't necessarily generate leads or sales online. They just exist in the online space and are accessible to anyone that chooses to use them.



Your Privacy

We use cookies and similar technologies to help personalise content, tailor and measure ads, and provide a better experience. By clicking OK or turning on an option on in Cookie Preferences, you agree to this, as outlined in our [Cookie Policy](#). To change preferences or withdraw consent, please update your Cookie Preferences.

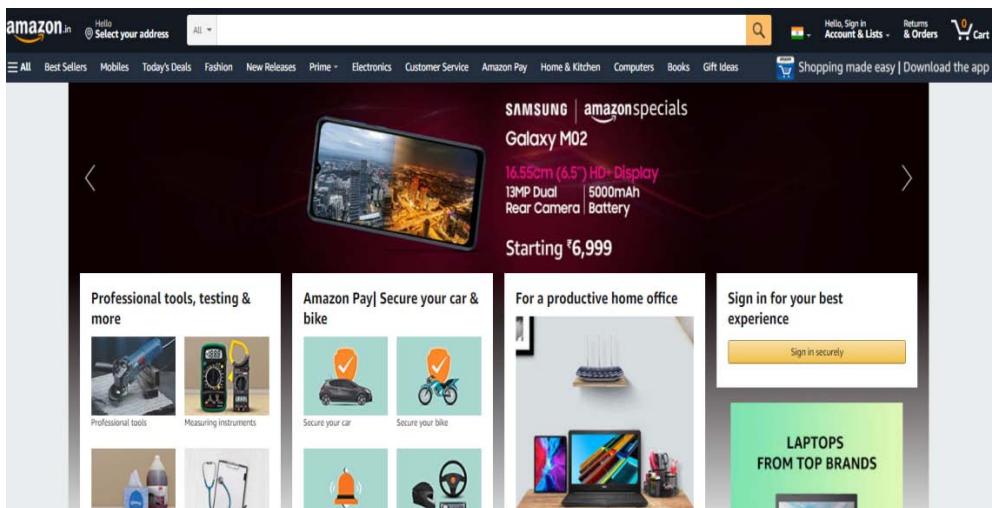
[Cookie Preferences](#)
[OK](#)


Fig 7.6: Examples of Utility Websites

7.7 DEVELOPMENT OF WEBSITE

Website development is the effort involved in developing a website for the Internet or an intranet. Web development can vary from developing a simple single static page of plain text to complex Web-based Internet applications, electronic businesses, and social network services. Web development is the maintenance and development of a website, basically it is the effort that happens in the backdrop to make a website look enormous, work speedy and perform sound with flawless user knowledge. Website development is a comprehensive process which is carried by the Web developers by using a diversity of coding languages. Various steps of web development process are explained in detail below:

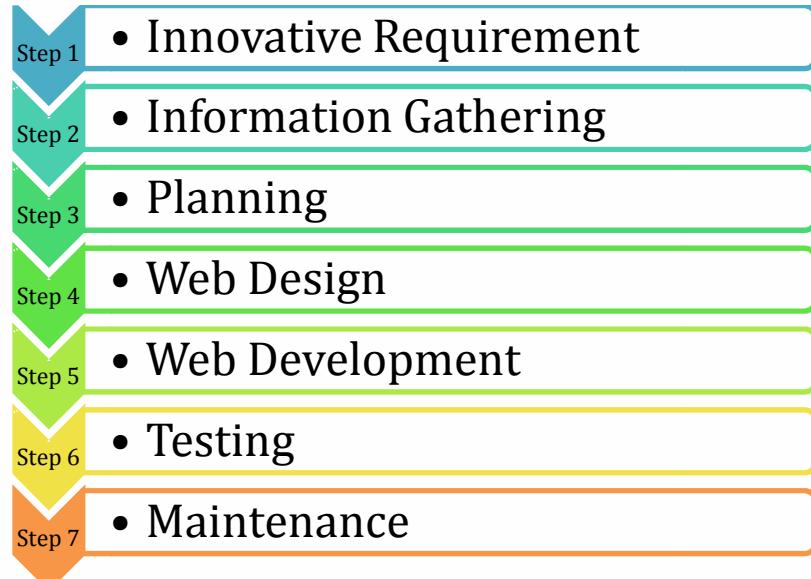


Fig 7.7: Steps of Website Development Process

Step-1: Innovative Requirement: Innovative requirement is the first and foremost requirement of the web development process. This is basically a discussion oriented step in which the client shares his ideas, needs and requirements with the web developers and on the basis of their demands the developers provide them innovative suggestions best suiting their requirements. Various inputs and outputs of innovative requirement are stated below:

Table 7.4: Various inputs and outputs of innovative requirement

Input	Output
<ul style="list-style-type: none"> Potential interview with the client, initial emails, proposals and supporting docs by the client, discussion notes. Recorded telephone conversations and Skype Chat Estimated Budget Portfolio Showcase 	<ul style="list-style-type: none"> Development process Estimated cost Team requirements (No of designers, developers, BA, QA, SEO etc.) Hardware-software requirements Report documents Final client approval for the project.

Step-2: Information Gathering: Information gathering stage is also known as discovery phase. In this phase, the designer portrays the client's vision into the paper and is most important phase of website design & development process. In this step, it is important to understand the purpose of creating a website, target audience as well as the content they look for. These factors are very crucial to determine in the fundamental phase of website design. Various inputs and outputs of information gathering are stated below:

Table 7.5: Various inputs and outputs of information gathering

Website Development

Input	Output
<ul style="list-style-type: none"> Reports from clients and documentations from Business Analyst 	<ul style="list-style-type: none"> Complete final project documentation with requirement specifications and individual work described to the designers as well as developers.

Step-3: Planning: Good website is the result of good planning. After the information gathering planning is important. Planning is nothing but prioritizing tasks for website completion. In this step, the sitemap of the website is developed in which menu, contents, navigational system etc. of the websites is developed. Various inputs and outputs of planning are stated below:

Table 7.6: Various inputs and outputs of planning

Input	Output
<ul style="list-style-type: none"> Final project documentation 	<ul style="list-style-type: none"> clickable prototype and sitemap containing all WebPages

Step-4: Web Design: Web design is the website that supports good look, feel and makes it different from others. This is the creative phase of website design. This is the phase where designers put their efforts to make the website look good and different from others. The designer needs to understand each and every aspect of the client's expectation and try to sketch it. In this step logo design, templates etc. are discovered. Various inputs and outputs of web design are stated below:

Table 7.7: Various inputs and outputs of web design

Input	Output
<ul style="list-style-type: none"> Wireframes 	<ul style="list-style-type: none"> Site design with layout templates and images

Step-5: Web Development: After designing, there is a development phase also known as 'implementing phase'. Now, this is the phase where the actual website starts its implementation. The development phase is also a very crucial phase for the website design. In this phase, all the information gathered from the initial phase is integrated like creating a database, logic & actual programming to name. Various inputs and outputs of web development are stated below:

Table 7.8: Various inputs and outputs of web development

Input	Output
<ul style="list-style-type: none"> Website with forms and complete requirement specifications 	<ul style="list-style-type: none"> Website with database driven functions, Coding docs

Tools: Dreamweaver CS6, Bootstrap, Jquery, AngularJS, CoIgnitor, PHP, CSS3, HTML5, Javascript

Step-6: Testing: After the Development phase, there is a Testing & Discovery Phase. The testing in this phase are done by Quality Assurance (QA), also responsible for preparing the test cases. The various types of website testing are. Content Testing, Functional Testing, Design Testing etc. Various inputs and outputs of testing are stated below:

Table 7.9: Various inputs and outputs of testing

Input	Output
<ul style="list-style-type: none"> The site, Requirement specifications, supporting documents, technical specifications, and technical documents. 	<ul style="list-style-type: none"> Complete website testing and error logs reports, frequent interaction with the developers and designers.

Tools: GTmatrix, Google Page speed tool, W3c Validation, Screaming Frog

Step-7: Maintenance: The last phase is Maintenance, in this stage, the maintenance of the website is done for a limited time period only. Maintenance means updating the contents & design of the website. The maintenance facility is provided for limited time by the company but if the user wants to extend the service, they are charged extra for it. Various inputs and outputs of maintenance are stated below:

Table 7.10: Various inputs and outputs of maintenance

Input	Output
<ul style="list-style-type: none"> Live Website, Analysis reports. 	<ul style="list-style-type: none"> Updated Website, Maintenance reports

Check Your Progress A:

1. Name the various phases of website development.

.....

2. How does a website help in market expansion?

.....

3. Distinguish between the sales websites and utility websites.

4. What is the significance of websites in information exchange?

7.8 INGREDIENTS REQUIRED FOR WEBSITE DEVELOPMENT

These days, the web is approximately unrecognizable from the early days of white pages with lists of blue links. Now, sites are premeditated with multifaceted layouts, exceptional fonts, and customized color schemes. For staying ahead of the competition, the interactivity of websites is a must and adding some of these types of capabilities requires a stronger programming language. Web design is actually how a site works and the feelings it invokes with its users. With this expanded perspective, below explained are ingredients that are critical for an optimal website:

1. **Clean navigation:** Navigation is the first thing people notice about the site. Top-notch navigation allows the users to move from page to page, and finding everything they want without wasting a fraction of a second. For example, in the figure 7.8, navigation is properly given through which the visitors can easily locate what they are looking for.
 2. **Beautiful typography:** Typography is a really big deal. A website that looks great always has beautiful typography. Typography starts with font choices, but goes far beyond into color, sizing, line height, paragraph margins and padding. For example, in the figure 7.8, content is very well designed and put to make it understandable for the visitors.
 3. **White space:** Proper spacing is critical for a great site. In fact, it may be the most important element. A message's impact depends on the element of space just as much as that message's content. Without white space, a site will turn into visual garbage quickly. For example, the figure 7.8 given below, proper space is provided between all the major and sub heads.

4. **Logical layout:** Logical Layout is somewhat vague, but a site must be connected in a way that makes sense. A great design will take a prospect through a journey, yet allow them to skip around at will. This is about presenting the right thing at the right time in the right way.

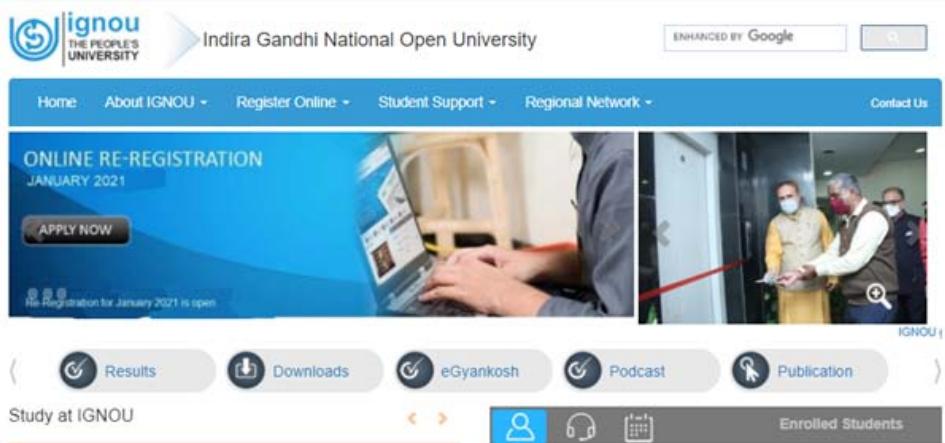


Fig 7.8: IGNOU Website

5. **Design with a purpose:** The best design is as little design as possible. This is a core foundational concept for beautifully designed sites. Everything within a great website should pack a punch; it should all accomplish something without getting in the way of itself. For example, IGNOU website is designed keeping in mind the motive to provide all necessary and mandatory information about the results, admission process, and assignments submission by the learners.
6. **Speed:** Speed wins over the internet. Customers do not like to wait much for their needs and they want to find what they need as soon as possible. Making the desired customers wait is more or less equivalent to losing forever. The speed of the website must be taken into proper consideration, the pages must download quickly and the orders must be processed quickly.
7. **Detail:** The website must provide the details the customers can look for such as product information, service information, customer service information etc. The details provided must be easy to access and sufficient enough to address the queries potential customers may have. For example, the IGNOU website in fig. 7.8 also provides various details about its locations, study centres, headquarter, contact information etc.
8. **Multiple feedback channels:** The website must provide the multiple communication and feedback options to the visitors such as phone number, an email, a live chat link, a discussion board or social media tools so that they can contact the concern authority in no time. In short, the website should be great, but it should also showcase other channels that allow the user to contact easily.

7.9 WEBSITE HOSTING

A web hosting service is a type of Internet hosting service that allows individuals and organizations to make their website accessible via World Wide Web. Web hosts are companies that rent out their services and technologies to host websites on the internet.

A space on a web server is allocated to store the files by the hosting provider. Web hosting makes the files available for viewing online. Web hosting provides services and infrastructure to develop, store, and deploy globally available websites and web apps in the cloud so startups can focus on applications and users.

Once the hosting company hosts the website, users can access it by typing in the web address (domain name) in their web browser. When they do this, their computer connects to the server on which the website is hosted. Web hosts can also provide data center space and connectivity to the Internet for other servers located in their data center, called Co-location. All websites on the internet need web hosting. When someone enters the domain name in a browser, the domain name is translated into the IP address of the web hosting company's computer. This computer contains website's files, and it sends those files back to the users' browsers.

7.9.1 Types of Website Hosting

Various types of web hosting services are explained in detail below:

1. **Shared hosting:** Shared hosting is perfect for entry-level website hosting. With a shared hosting plan, all domains share the same server resources, such as RAM (Random Access Memory) and CPU (Central Processing Unit). However, because all resources are shared, the costs of shared hosting plans are relatively low, making them an excellent option for website owners in their beginning stages. Although shared hosting provides website owners with a more simplistic approach to the web. This means that surges in usage can ultimately affect the website's user experience. Shared hosting plans are ideal for website owners that do not receive a large amount of web traffic.
2. **Virtual private server (VPS) hosting:** A VPS hosting plan is the ultimate middle ground between a shared server and a dedicated server. It is ideal for website owners, who need more control, but do not necessarily need a dedicated server. VPS hosting is unique because each website is hosted within its own space on the server, though it still shares a physical server with other users. VPS hosting provides website owners with more customization and storage space. Typically, VPS hosting is used by website owners who want dedicated hosting but do not have the technical knowledge needed.

3. **Dedicated server hosting:** Dedicated hosting gives website owners the most control over the server on which their website is hosted. Dedicated servers' cost is one of the most expensive web hosting options. They are mostly used by website owners with high levels of website traffic, and those who are in need of complete control of their servers. In addition, a high level of technical expertise is required for the installation and ongoing management of the server. The user has full administrative access to the server, which means the client is responsible for the security and maintenance of his own dedicated server.
4. **Cloud hosting:** Cloud hosting is the current buzzword of the technology industry. In Web hosting, it means many computers working together, running applications using combined computing resources. This allows users to employ as many resources as they need without having to build and maintain their own computing infrastructure. The resources that are being used are spread across several servers, reducing the chance of any downtime due to a server malfunction. Cloud-based hosting is scalable, meaning that site can grow over time, using as many resources as it requires and while the website owner only pays for what they need.
5. **Managed hosting:** The user gets his or her own Web server but is not allowed full control over it (user is denied root access for Linux/administrator access for Windows); however, they are allowed to manage their data via FTP or other remote management tools. The user is disallowed full control so that the provider can guarantee quality of service by not allowing the user to modify the server or potentially create configuration problems. The user typically does not own the server. The server is leased to the client.
6. **Co-location web hosting service:** Co-location web hosting service is similar to the dedicated web hosting service, but the user owns the co-server; the hosting company provides physical space that the server takes up and takes care of the server. This is the most powerful and expensive type of web hosting service. In most cases, the co-location provider may provide little to no support directly for their client's machine, providing only the electrical, Internet access, and storage facilities for the server
7. **Clustered hosting:** Cluster hosting allows multiple servers hosting the same content for better resource utilization. Clustered servers are a perfect solution for high-availability dedicated hosting, or creating a scalable web hosting solution. A cluster may separate web serving from database hosting capability. Usually, web hosts use clustered hosting for their shared hosting plans, as there are multiple benefits to the mass managing of clients.
8. **Grid hosting:** Grid hosting is a service that provides grid computing Capabilities to its clients This form of distributed hosting is adopted

when a server cluster acts like a grid and is composed of multiple nodes. Much like cluster hosting, grid hosting makes it less likely that a spike in resource needs will take site offline

7.9.2 Web Hosting Alternatives

Websites are an important component of business these days. Hosting of websites may not be feasible due to technology, budget, infrastructure, and continuous updating. Web hosting is referred to as storage of contents on the web server (host) of the hosting service provider. The host can be anywhere in the world but it has power, internet connections and dedicated IP addresses. Data Centre has all necessary hardware and software that provide the connections through the Internet, Intranet, and Extranet. In a Co-location (also spelled Co-location) service, the service provider rents a physical space to the client to install its own server hardware. These features make your site available 24×7×365.

The service provider is responsible for maintaining the Web server hardware and software, and provides the connection to the Internet through its routers and other network hardware. Since the whole world is moving from brick & Mortar system to click & Mortar system and due the usage of Smartphone the app based business restricts to mobile hence the app is taken as a replacement to websites.

Check Your Progress B

1. Differentiate between HTTP and HTML.

.....
.....
.....
.....
.....
.....

2. What is a URL? Give an example of URL.

.....
.....
.....
.....
.....

3. What do you understand by web hosting?

.....
.....
.....

4. Distinguish between cloud hosting and cluster hosting.

7.10 LET US SUM UP

A website (also in black and white as a web site) is a compilation of web pages and associated content that is acknowledged by a general domain name and published on at least one web server. Various examples of websites are wikipedia.org, google.com, and amazon.com and www.ignou.ac.in etc. Basically, for a layman a website is a set of data and information about a particular subject which is available on the Internet. Websites can be used in various ways for a number of purposes such as a personal website for someone's own business or profession, a corporate website for a company, a government website for any government organization or any other organizational website, etc.

Every URL link that begins with HTTP uses a basic type of "hypertext transfer protocol". Which was developed in early 19909's by Tim Berners-Lee. This network protocol enables web browsers and servers to communicate through the exchange of data. Hyper Text Transfer Protocol Secure (HTTPS) is the secure version of HTTP, the protocol over which data is sent between your browser and the website that you are connected to. The 'S' at the end of HTTPS stands for 'Secure'. It means all communications between browser and the website are encrypted.

The choice of the type of websites depends on the requirement of the seller. Websites can mainly be categorized into four broad categories namely authority website, lead generation website, sales website and utility website explained in detail below respectively. By knowing the requirements of website in advance, one can save unnecessary wastage of time, money and opportunity cost.

Website development is the effort involved in developing a website for the Internet or an intranet. Web development can vary from developing a simple single static page of plain text to complex Web-based Internet applications, electronic businesses, and social network services. Web development is the maintenance and development of a website. Basically, it is the effort that happens in the backdrop to make a website look informative, speedy

processing and provide exact information. Process of website development includes various steps such as, innovative requirement, information gathering, planning, web design, web development, testing & maintenance.

These days the web is approximately unrecognizable from the early days of white pages with lists of blue links. Now, sites are premeditated with multifaceted layouts, exceptional fonts, and customized color schemes. For staying ahead of the competition, the interactivity of websites is a must and adding some of these types of capabilities requires a stronger programming language. Web design is actually how a site works and user friendliness. Expanded perspective ingredients critical for an optimal website are clear navigation, beautiful typography, white space, logical layout, synergy between message and design, design with a purpose, speed ,detail, multiple feedback channels etc.

A web hosting service is a type of Internet hosting service that allows individuals and organizations to make their website accessible via World Wide Web. Web hosts are companies that rent out their services and technologies to host websites on the internet. Once the hosting company hosts the website, users can access it by typing in the web address (domain name) in their web browser. When they do this, their computer connects to the server your website is hosted on. Various types of web hosting are Shared hosting, Virtual private server (VPS) hosting, Dedicated server hosting, Cloud hosting, Managed hosting, Co-location web hosting service, Clustered hosting, Grid hosting etc.

7.11 KEY WORDS

HTML: Hyper Text Markup Language (HTML) is the set of markup symbols or codes inserted into a file intended for display on the Internet. The markup tells web browsers how to display a web page's words and images.

HTTP: Hypertext Transfer Protocol (HTTP) is a connectionless text-based protocol. Clients (web browsers) send requests to web servers for web elements such as web pages and images. After the request is serviced by a server, the connection between client and server across the Internet is disconnected.

Search Engine: Search engine is a web service that helps in finding other web pages, such as Google, Bing, Yahoo etc. are normally accessed through a web browser or through a web page.

URL: URL stands for Uniform Resource Locator. A URL is nothing more than the address of a given unique resource on the Web.

Web Browser: A web browser is an application used to access and view websites. Examples of most commonly used web browsers are Microsoft

Edge, Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari etc.

Web Hosting: Web hosting is an online service that enables the publishing of a website or web application on the Internet. When one signs up for a web hosting service, they basically rent some space on a physical server.

Web Page: Web pages are also called just pages. Basically, a web browser is a document which can be displayed in a web browser.

Web Server: A server is a computer that provides data to other computers. The data may be served to a system either on a local area network (LAN) or on a wide area network (WAN) over the Internet.

Website: A website is a collection of related web pages, including multimedia content, typically identified with a common domain name, and published on at least one web server.

7.12 TERMINAL QUESTION

- 1) What is a website?
- 2) Briefly explain the origin of the website.
- 3) What are the various types of websites?
- 4) State the usages of websites.
- 5) State the differences between HTTP and HTTPS.
- 6) State the various phases of the website development process.
- 7) What are the various ingredients required for making a website?
- 8) What is web hosting? What are the various types of web hosting?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 8 E-COMMERCE SOFTWARE PLATFORM

Structure

- 8.0 Objectives
- 8.1 Introduction
- 8.2 E-commerce Software Platform
- 8.3 Types of E-commerce Platform
 - 8.3.1 Shopify- An Online Store Builder
 - 8.3.2 E-Auction Processes The Real-Time Visibility
 - 8.3.3 Paypal Holdings Online Payments
 - 8.3.4 SAP Commerce Cloud
- 8.4 Functions of E-Commerce software Platforms
- 8.5 Advanced Functions of E-Commerce Software
- 8.6 E- Commerce Software for Small & Midsize Companies
- 8.7 E- Commerce Software for Midsize to Large Business
- 8.8 E- Commerce Software for Large Business
- 8.9 Planning Electronic Commerce Initiatives
- 8.10 Strategies for Developing E- Commerce Websites
- 8.11 Managing E- Commerce Implementations
- 8.12 Let Us Sum Up
- 8.13 Key Words
- 8.14 Answers to Check Your Progress
- 8.15 Terminal Question

8.0 OBJECTIVES

After studying this unit, you should be able to,

- understand basics of e-commerce software;
- know about various types of software platforms;
- know about the functions of e- to understand commerce software;
- understand the uses of e-commerce software for small, midsize, large business;
- explain strategies for developing e-commerce websites; and
- learn managing the implementation process of e-commerce in business.

8.1 INTRODUCTION

E-commerce software platform is the driving force of an online store, making it feasible to effortlessly manage inventory, add or remove products, calculate taxes, and everything else required to manage a website and fulfill orders.

Today's competitive organizations need to develop a wide range of e-commerce software that can tap as much data as possible and quickly deploy that data via the web to managers, employees, partners, suppliers, customers and constituents everyone they depend on to make decisions. Developing usable, deployable, and scalable e-commerce software is becoming essential every day. Finally, a true Web architecture is essential for rapidly providing these business intelligence applications to unlimited number of people, and see a quick return on investment. It can use the same Web-based, integrated Windows development solution to deploy information with speed, quality, and effectiveness that users of all levels can use to access information in any format. In addition, it can securely manage and administer the system while still allowing power users to develop their own application. The unit further brief on various popular E-commerce software.

8.2 E-COMMERCE SOFTWARE PLATFORM

A platform is basically a position of software and connecting an ecosystem of resources that helps companies to grow the business. A platform enables expansion through relation, its value comes not only from its own features, but from its ability to tie external tools, teams, data, and processes etc. E-commerce software platform is the engine behind the scenes of an online store, making it possible to easily handle inventory, add or remove products, calculate taxes, and everything else required to administer a website and fulfill orders.

E-commerce software simplifies intricate processes in a friendly user interface that enables people from non-technical backgrounds to oversee an entire e-commerce process. Despite the ease of use that e-commerce software brings to an online business, it is a versatile and complex machine. In the coming heads we are going to discuss the various functions of software which would be useful in running a business.

8.3 TYPES OF SOFTWARE PLATFORMS

More or less, every grassroots entrepreneur who starts a setup from scratch or runs the existing business needs some kind of a 'platform'. Yet very few will self-assuredly respond a seemingly simple, but very significant query: What kind of platform do you build?

Google Search, Facebook, Android, Uber, AirBnB, Waze, Amazon Web Services, Amazon Marketplace, WeWork, and even Bitcoin are all platforms. At the same time, these platforms are very dissimilar in how they generate network effects, interactions they facilitate.

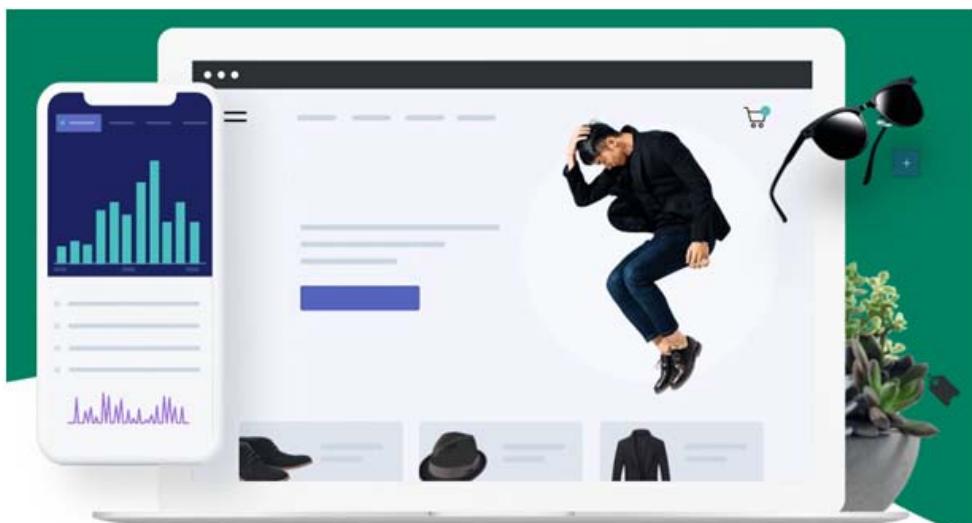
There are various kinds of E-commerce software which have certain characteristics and could be used as per the need and requirement. We will throw light on a few of them on one-to-one basis so that learners are able to visualize how these types of software platforms work.



Figure 8.1: Types of Software platforms

8.3.1 Shopify- An Online Store Builder

Shopify is an easy-to-use online store builder trusted by over 1,000,000 stores. By entering your email, you agree to receive marketing emails from Shopify. 100+ Professional Themes. Drop Shipping Integration. Social Media Integration. Unlimited Bandwidth. SEO Optimized.



*Source: <https://www.shopify.in>

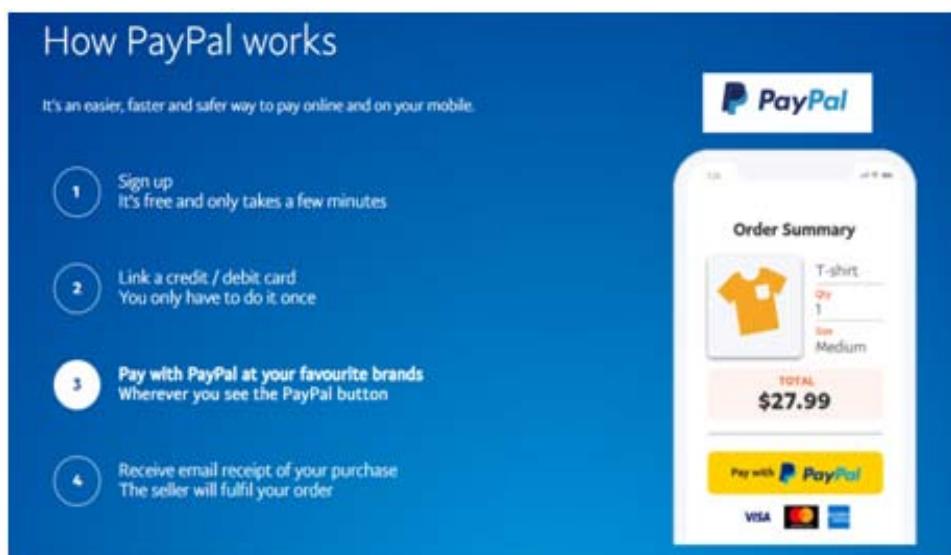
Figure 8.2: Shopify

8.3.2 E-Auction Processes the Real-Time Visibility

E-Auction processes the real-time visibility of the bids happening on any product. Sellers will have the elasticity to offer products with different prices and at the same time, buyers will have a translucent bidding process to show their instant response. Selling Products online with an auction setup helps the merchants to know the competitive environment of E-Commerce as well as the auction industry. Bidders who participate in the auction will have an unlimited reach of the global audience and can easily filter out the products in high demand.

8.3.3 Paypal Holdings Online Payments

PayPal Holdings, Inc. is an American company operating an online payments system in the majority of countries that support online money transfers, and serves as an electronic alternative to traditional paper methods like checks and money orders. PayPal is one of the largest online payment processors in the world. Shopping or selling with PayPal, make it faster, safer and easier for everyone to shop or sell globally with confidence.



*Source: PayPal

Fig 8.3: PayPal

8.3.4 SAP Commerce Cloud

SAP is at the centre of today's technology revolution. The market leader in enterprise application software, SAP helps organisations fight the damaging effects of complexity, generate new opportunities for innovation and growth, and stay ahead of the competition. SAP Commerce Cloud Helps the business lead through innovation to deliver exceptional omni-channel buying experiences with a cloud-native, headless e-commerce solution. SAP India is the fastest growing subsidiary of SAP SE, the world's leading provider of business software solutions.



*Source: SAP

Figure 8.4: SAP Commerce Cloud

8.4 FUNCTIONS OF E-COMMERCE SOFTWARE PLATFORMS

E-commerce software is the driving force behind the scenes of an online store which makes it likely to effortlessly administer stock, add or remove products, compute taxes, and the whole thing else required to handle a website and accomplish orders. The basic function of e-commerce software includes the following three important sections:



Figure 8.5: Function of E-Commerce Software

1. **Catalog display:** To display products offered by an organization they have to be arranged in a systematic manner including customer preferences with the help of simple static catalog. The webpage is written in HTML to display a series of Web pages which can be edited by companies as and when needed. Dynamic catalog stores that are specifically designed on the basis of customer choice including multiple photos of each item description of product including search feature that allows customers easily search product availability. A dynamic catalog stores the information about items in a database, usually on a separate computer that is accessible to the server that is running the Web site itself.
2. **Shopping cart capabilities:** Selected items in the early days of e-commerce, they have to fill a form or a list they want to purchase by

filling out online forms. Using text box and list box form controls to indicate their choices, users enter the quantity of an item in the quantity text box, the SKU (stock-keeping unit) or product number in another text box, and the unit price in yet another text box. This system is full of hassles especially if your order nature is multiple items at the same time.

3. **Transaction processing:** Transaction processing includes, checking in/out process shoppers initiate on website or mobile application. The electronic software performs necessary calculations such as number of items, volume, discounts, tax, and shipping cost. When order is placed and customer checks out; the transaction process enters the next stage where secure communication caution states from buyer to seller for necessary transactions. Transaction process is an important and complex part of online sales. Transaction processing is always a typical part of online business. Once order is placed, then the responsibility and moral duty of the seller is towards the customer to provide secure, effective and in time communication for the delivery of goods and services with feedback.

8.5 ADVANCED FUNCTIONS OF E-COMMERCE SOFTWARE

Integrating different components is important for large businesses houses, because range of products are not limited, their business interest spread over many products and services. The other operations of e-commerce activities are as follows:

1. **Middleware:** Such larger companies need to establish the connections between their e-commerce software and their existing business/accounting system by using a type of software called middleware. Some large companies that have sufficient IT staff write their own middleware. However, most companies purchase middleware that is customized for their businesses by the middleware vendor or a consulting firm. Thus, most of the cost of middleware is not the software itself, but the consulting fees needed to make the software work in a given company. Making a company's information systems work together is called interoperability and is an important goal of companies when they install middleware. Middleware cost range from few lakhs to several millions depending on complexity and existing systems.
2. **Enterprise application integration and databases:** A program that is used to perform specific functions, such as creating and arranging invoices, calculating payroll, or processing payments received from customers, is performed by different application software or, more simply, an application. An application server is a computer that takes the request messages received by the Web server and runs application programs that perform some kind of action based on the contents of the

request messages. The actions that the application server software performs are determined by the rules used in the business. These rules are called business logic. An example of a business rule is, when a customer logs in, check the password entered against the password file in the database. Application servers are usually grouped into two types, page-based and component-based systems. Page-based application systems return pages generated by scripts that include the rules for presenting data on the Web page with the business logic. Larger businesses often prefer to use a component-based application system that separates the presentation logic from the business logic. Each component of logic is created in its own module.

3. **Web services:** Web server includes all information that can be communicated across organization in the different applications and clients. Although a generally accepted definition has not yet evolved, many IT professionals define Web services as a combination of software tools that let application software in one organization communicate with other applications over a network by using a specific set of standard protocols known by their acronyms as SOAP, UDDI, and WSDL etc. Another definition of Web services that IT professionals use is a self-contained, modular unit of application logic that provides some business functionality to other applications through an Internet connection.
4. **Integration with ERP systems:** Enterprise Resource Planning (ERP) connects to existing information available on the basis of B2B websites. ERP software is a collection of different programs that integrate all facts of business including accounting, logistics, manufacturing, planning, project management, and treasury function. The major ERP vendors include Baan, Oracle, PeopleSoft, and SAP. A typical installation of ERP software costs between 10 lakhs to 15 lakhs. Thus, companies that are already running these systems have made a significant investment in them and expect their electronic commerce sites to integrate with them.

8.6 E-COMMERCE SOFTWARE FOR SMALL AND MIDSIZE COMPANIES

Web hosting services can be hired so that in-house burden can be shifted and dedicated hosting services can be used. Web host CSPs (Compute cycles Service Providers) have the same advantages as ISP (Internet Service Provider) hosting services, including spreading the cost of a large Web site over several “renters” hosted by the service. The biggest single advantage - low cost - occurs because the host provider has already purchased the server and configured it.

Mall-style Commerce service providers (CSPs) provide small businesses with a high speed Internet connection, Website creation tools, and little or no banner advertising clutter. Web hosts in this group charge a monthly fee that

is often higher than that of lower-end providers, and may also charge one-time setup fees. Some of these providers also charge a percentage of or fixed amount for each customer transaction. These Web hosts also provide high quality tools, storefront templates, an easy-to-use interface, and quick Web page generation capabilities and page maintenance.

Mall-style CSPs provide shopping cart software or the ability to use another vendor's shopping cart software. They also furnish customer payment processing so that customers can choose to purchase their goods and services with a credit card or other form of payment. The CSP processes the acceptance and authorization of credit cards on behalf of the merchant. Another benefit is that because they are paying a monthly fee to the CSP, sites do not have to display any Web banners, which can be unattractive and distracting. The fourth benefit of the mall-style CSPs is that they provide higher-quality Web store building and maintenance tools than do the basic CSPs. CSPs that offer mall-style commerce services include eBay Stores and Yahoo! Store. Another CSP that began as a mall-style service is big step, but it no longer uses the mall structure. All three of these CSPs offer Web site construction tools that can be used by small and midsize businesses to take their businesses online.

8.7 E-COMMERCE SOFTWARE FOR MIDSIZE TO LARGE COMPANIES

There is a number of E-commerce software available for midsize and large businesses. These software packages differ on price, capabilities, database connectivity, software portability, software customization, tools and technical expertise required to manage the software. Some of them are mentioned below:

- 1. Website development tools:** Although they are more often used for creating small business sites, it is possible to construct the elements of a midrange e-commerce Web site using Web page creation and site management tools. For example, recent versions of Macromedia Dreamweaver include all integrated development environments.
- 2. Inter shop enfinity:** It Provides search and catalog capabilities, electronic shopping carts, online credit card transaction processing, and the ability to connect to existing back-end business systems and databases.
- 3. IBM Web Sphere commerce professional edition:** It is a set of software components that provide software suitable for midsize to large businesses to sell goods and services on the Internet It includes catalog templates, setup wizards, and advance catalog tools to help companies create attractive and efficient electronic commerce sites.

4. **Microsoft commerce server 2002:** It allows businesses to sell products or services on the Web using tools such as user profiling and management, transaction processing, product and service management, and target audience marketing.

Check Your Progress A:

- 1) What is a shopping cart?

.....
.....
.....
.....
.....
.....
.....
.....

- 2) What are the advantages of mall-style CSPs?

.....
.....
.....
.....
.....
.....
.....
.....

- 3) What is the usage of E-commerce software Inter shop enfinity?

.....
.....
.....
.....
.....
.....
.....
.....

- 4) What is a middleware?

.....
.....
.....
.....
.....
.....

8.8 E-COMMERCE SOFTWARE FOR LARGE COMPANIES

Large e-commerce sites deal with transactions of higher volume and therefore needs dedicated software to handle specific elements of their online business such as customer relationship management, supply chain management, content management and knowledge management. So, the prices as well as support cost are high for large-scale e-commerce software. Large scale e-commerce software is also called enterprise E-commerce software. Enterprise e-commerce software provides tools for both B2B and B2C commerce and can interact with a wide variety of existing systems, including database, accounting, and ERP systems. The enterprise software is also capable of making changes in the system automatically (e.g., inventory checking and order placement for items needed). In contrast, both basic and midrange E-commerce software usually require an administrator to manually make such changes. Enterprise E-commerce software usually requires several dedicated computers. IBM Websphere Commerce Business Edition, Oracle E-Business Suite, and Broad vision Commerce Agility Suite are few examples of E-commerce software. Various e-commerce software for large sized companies are stated below:

1. **Enterprise-class electronic commerce software:** Enterprise-class e-commerce software running large online organizations usually requires several dedicated computers - in addition to the Web server system and any necessary firewalls. Examples of enterprise-class products that can be used to run a large online business with high transaction rates include IBM Websphere Commerce Business Edition, Oracle E-Business Suite, and Broad vision One-To-One Commerce.
2. **Customer relationship management software:** This software obtains the data from operations software that conducts activities such as sales automation, customer service center operations, and marketing campaigns. The software must also gather data about customer activities on the company's Web site and any other points of contact the company has with its existing and potential customers.
3. **Supply chain management software:** This software helps companies to coordinate planning and operations with their partners in the industry supply chains of which they are members. SCM software performs two general types of functions: planning and execution.
4. **Content management software:** These software help in arrangement of data in such a manner that can be accessed easily for business decision making. Helps companies control the large amounts of text, graphics, and media files that have become a key part of doing business. With the rise of wireless devices, such as mobile phones, handheld computers, and

personal digital assistants (PDAs), content management has become even more important.

5. **Knowledge management software:** This software is used by different companies to do four main things: collect and organize information, share the information among users, enhance the ability of users to collaborate, and preserve the knowledge gained through the use of information so that future users can benefit from the learning of current users. KM software includes tools that read electronic documents (in formats such as Microsoft Word or Adobe PDF), scanned paper documents, e-mail messages, and Web pages processing.

8.9 PLANNING E-COMMERCE INITIATIVES

The ability of the businesses to plan, design and implement cohesive electronic commerce strategies will make the difference between success and failure for the majority of them. The tremendous leverage that a firm can gain by being the first to do businesses a new way on the web has caught the attention of top executives in many industries. The key to successful implementation of any information technology project are planning and execution. A successful business plan for an electronic commerce initiative should include activities that identify the initiative's specific objectives and link those objectives to business strategies. In setting the objective for an electronic commerce initiative, managers should consider the strategic role of the project, its intended scope, and resources available for executing it. Thus, four major steps in planning electronic commerce initiatives are as follows:

1. **Identify potential e-commerce initiatives:** Electronic-commerce can provide two benefits to companies: first, value creation or value enhancement for one or more of a company's stakeholder groups; and second, lower costs.
2. **Analyse the functional scope of e-initiatives:** Electronic initiatives decided on the basis of e-commerce network and Functional scope between them. Managers should keep in mind about the architecture needed for e-commerce and its functional scope. Services and capabilities are the basis of the e-commerce network layer which include basic communication services and infrastructure components like security and reliability. These do not add value but are necessary for further process. Decision process ameliorates management's ability to make decisions. Integration process permits the automation of processes between a company and its customers or suppliers. Trade processes support buying and selling online. They can both add value and save costs for business transactions.
3. **Analyse the sustainability of benefits from e-commerce initiatives:** E-commerce is coordinated use of software and system that enables external parties in business which includes competitors to obtain insight

into a company's operations. Thus, innovations involving electronic commerce interactions can be easily copied and even ameliorated upon by competitors, often at lower cost. So, it is important to examine the sustainability of any competitive advantage that might be derived from an e-commerce project. For the most part, sustainability is acquired from two key factors i.e. barriers to entry and early mover advantages.

4. **Prioritize e-commerce initiatives:** The outcome of planning is planned since several e-commerce plans may well be under analysis at the same time, perhaps by different groups or units within the same organization. Managers (executives) must be able to choose among them. Decision making is based upon the alternatives available according to plan; the traditional cost-benefit analysis can be applied to electronic commerce initiatives and combined with a portfolio drafting approach for prioritizing and scheduling projects for effective e-commerce houses.

8.10 STRATEGIES FOR DEVELOPING E-COMMERCE WEBSITES

The commerce industry is growing with rapid speed as growth rate is continuously increasing. The process of e-commerce website development project are categories into seven major steps which are as follows:

1. **Identify the product/service, and the customer:** The first step for e-commerce website development is to identify the products/services which the company wants to sell in the market to the target population. As it is essential to identify which products are to be sold and to whom.
2. **Know your e-commerce customer:** KYeC is vital for any business to understand who their customer is for success in the long run. So, they can allure them in the best possible way. One way to obtain this is by evaluating the customers of the competitors.
3. **Choose the right e-commerce website development platform:** Appropriate e-commerce platform is a software suite that aids build the e-commerce store where marketers make their products available, and customers can process transactions. Choosing the right e-commerce platform is vital to any online business as it is the very foundation of the business.
4. **Choose the right e-commerce website hosting platform:** Business success and failure choice of server and hosting are a crucial factor. It determines the website's accessibility and performance efficiency. Costs cutting are an important factor while deciding about website hosting and support; outsourcing can be exercised.
5. **Choose the right e-commerce development partner:** Choosing for e-commerce technology development partners or e-commerce vendors

can be very difficult. The market is very crowded with service providers and with each one claiming to offer the services which suit best to company needs.

6. **E-commerce website testing:** After completion of the website development, the next crucial step is e-commerce website testing. Testing checks usability, customer convenience, checks for bugs, and is important to providing a good shopping experience. Testing is usually implemented in various browsers, across platforms, and across devices. Websites can be tested manually, or automatically, or a combination of the two followed by feedback.
7. **Effective marketing:** E- marketing plays a crucial role at this stage, it is important to advertise it to people. For advertising the website, marketers need to have a promotional plan drafted out including all means of advertising. In a crowded market of business owners competing for customers' attention, it is hard to get new customers or sustain existing ones without proper marketing.

8.11 MANAGING E-COMMERCE IMPLEMENTATIONS

E-commerce business depends upon implementation and adoption in process; successful systems have seven key steps such as

1. **Strategic business planning and roadmaps:** Strategy is about making the right choices that will help reach the stated e-commerce business objectives. There should be an articulated vision, mission and objective about what will be achieved, time limit for it, financial budget, identification of the right resources for and constraints in the face of implementing the strategy mentioned in the business plan, and what elements will be considered for future.
2. **Technology selection/ website audit and analysis:** To provide the maximum benefit to or creating value for the end customer, selection of e-commerce technology should have the capability of adapting according to customers' needs, and be able to complement the business model, and ensure the alignment with the existing best practices in offline retail.
3. **Customer acquisition:** Online or popular digital marketing consists multiple tools for contact to the new generation of customers, who access online content through multiple devices, through search engine optimization, search engine marketing (paid advertisement), social media marketing (both cost per click and cost per thousand impressions), email campaigns, display advertisements through various ad networks, referral programs and retargeting campaigns.

4. **Customer engagement:** Engaging customers through various social media channels also instills superior trust in the minds of customers. Nowadays, customers seek to analyse the brands to understand the core benefits and unique value proposition provided by the brand, they look for offers, discounts and offers during special seasons, a mechanism for queries/clarifications relating with the products displayed and interaction with customer support executives etc.
5. **Customer retention:** It should be noted that to fully leverage best technology, there should be a constant effort to pay attention for features and functionalities that will strengthen the customer experience. With the arrival of sophisticated electronic-commerce technologies, one-to-one customer experience is becoming a reality in business and new age retailers will be able to retain by providing customized services and products and that's the best a customer can really expect.
6. **Optimization based on key metrics:** Some of the key elements to measure the health of an e-commerce venture are the total revenue generated, customer acquisition cost, percentage of customers converted, and percentage of customers entering the website by using various channels. However, these elements may vary based on the business objectives and so every electronic business needs a fully customized approach for defining the key elements and further analysis. After that, a deeper level of optimization is needed at 2 levels – on the technology and the business front.
7. **Business analysis and customer insights:** The last step of this process is about knowing the product group that has performed well in comparison to other products in the webstore. Assessing this is crucial for a company to survive in the market as those categories occupy the prime real estate in the online world – the web store. It should consist of understanding the customer segments, demographics, profitable customers, source of channels, per customer contribution in profit of the company in percentage and the marketing spends that has gone into acquiring these customers.

Check Your Progress B:

Part A: State which of the following statements is true and which are false.

- i) Websites are effective tools for E-business.
- ii) E-commerce software is a tool that drives online processes.
- iii) There is no role of the Internet for dramatic transformation of companies.
- iv) E-commerce strategies are a group of E-business plan.
- v) Future of business is E-commerce prioritization.

Part B: Fill in the blanks.

- i) _____ is a collection of web pages.
- ii) Web hosts can _____ in the world.
- iii) Language to write web pages is _____.

8.12 LET US SUM UP

Websites are an important component of business these days, hosting of websites may not be feasible due to technology, budget, infrastructure, and continuous updating. Web hosting referred to as service providers where the website has to be stored on some server, that server is your host. The host can be anywhere in the world but it has power, internet connections and dedicated IP addresses.

More or less every grassroots entrepreneur who started a setup from scratch or runs the existing business currently fabricates some kind of a ‘platform’. Google Search, Facebook, Android, Uber, AirBnB, Waze, Amazon Web Services, Amazon Marketplace, WeWork, and even Bitcoin are all platforms. At the same time, these platforms are very dissimilar in how they generate network effects, interactions they facilitate. There are various kinds of E-commerce software which have certain characteristics and could be used as per the need and requirement.

The basic function of e-commerce software includes catalog display, Shopping cart capabilities and Transaction processing. Integrating different components is important for large businesses houses, because range of products are not limited, their business interest spread over many products and services. The other operations of electronic commerce activities are Middleware, Enterprise Application Integration and Databases, Web Services, and Integration with ERP Systems. Web hosting services can be hired so that in-house burden can be shifted and dedicated hosting services can be used. Web host CSPs (Compute cycles Service Providers) have the same advantages as ISP (Internet Service Provider) hosting services, including spreading the cost of a large Web site over several “renters” hosted by the service. The biggest single advantage - low cost - occurs because the host provider has already purchased the server and configured it.

There are a number of E-commerce software available for midsize and large businesses. These software packages differ on price, capabilities, database connectivity, software portability, software customization, tools and technical expertise required to manage the software. Some of them are Web site development tools, Inter shop enfinity, IBM WebSphere Commerce Professional Edition and Microsoft Commerce Server 2002. Large e-commerce sites deal with transactions of higher volume and therefore needed dedicated software to handle specific elements of their online business such as customer relationship management, supply chain management, content

management and knowledge management. The enterprise software is also capable of making changes in the system automatically (e.g., inventory checking and order placement for items needed). In contrast, both basic and midrange E-commerce software usually require an administrator to manually make such changes. Enterprise E-commerce software usually requires several dedicated computers.

The ability of the businesses to plan, design and implement cohesive electronic commerce strategies will make the difference between success and failure for the majority of them. The key to successful implementation of any information technology project are planning and execution. four major steps in planning electronic commerce initiatives are Identify Potential e-Commerce Initiatives, Analyse the Functional Scope of Electronic Initiatives, Analyse the Sustainability of Benefits from e-commerce Initiatives and Prioritize e-Commerce Initiatives.

The commerce industry is growing with rapid speed as growth rate is continuously increasing. The process of e-commerce website development project are categories into seven major steps which are identify the product/service, and the customer, Know your e-commerce customer, Choose the right electronic commerce website development platform, Choose the right electronic commerce website hosting platform, Choose the right electronic commerce development partner, Electronic commerce website testing and effective marketing. E-commerce business depends upon implementation and adoption in process; successful systems have seven key steps such as Strategic business planning and roadmaps, Technology selection/ website audit and analysis, Customer acquisition, Customer engagement, Customer retention, Optimization based on key metrics and Business analysis and customer insights.

8.13 KEYWORDS

Enterprise resource planning (ERP): ERP is a process used by companies to manage and integrate the important parts of their businesses. Many ERP software applications are important to companies because they help them implement resource planning by integrating all of the processes needed to run their companies with a single system.

Middleware: Middleware is software which lies between an operating system and the applications running on it. It establishes connection between e-commerce software and existing business and enables communication and data management for distributed applications

Online Business: Online Business or e-business is any kind of business or commercial transaction that includes sharing information across the internet. Online business does not only deal with online transactions of selling and buying of a product and/or service but also enables to conduct business processes within the value chain through internal or external networks.

Shopping Cart: A shopping cart is a piece of software that keeps the record of the items a buyer has ‘picked up’ from the online store. Shopping cart enables consumers to select products, review what they selected, make modifications or add extra items if needed, and purchase the products.

Web Hosting: Web hosting makes the files that comprise a website (code, images etc.) available for viewing online. Every website you've ever visited is hosted on a server. When a hosting provider allocates space on a web server for a website to store its files, they are hosting a website.

Website: A website (also written as a web site) is a collection of web pages and related content that is identified by a common domain name and published on at least one web server. Notable examples are wikipedia.org, google.com, and amazon.com etc.

8.14 ANSWER TO CHECK YOUR PROGRESS

Check Your Progress B

Part A:

- (i) True ii) True iii) False iv) True v) False

Part B:

- (i) website ii) anywhere iii) HTML

8.15 TERMINAL QUESTIONS

- 1) What is web hosting software? Why are they important in online business?
- 2) Describe various types of software platforms.
- 3) Name commonly used e-commerce software for small & midsize companies.
- 4) How do we plan e-commerce initiatives?
- 5) What are the most advanced functions of e-commerce software?
- 6) “Web site development is a creative process” comment.
- 7) Why is customer engagement and retention an important tool for an e-commerce business?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 9 WEB SERVER HARDWARE AND SOFTWARE

Structure

- 9.0 Objectives
 - 9.1 Introduction
 - 9.2 Meaning of Server
 - 9.3 Web Server Essentials
 - 9.3.1 Different Types of Web Server
 - 9.3.2 Characteristics of a Web Server
 - 9.7.3 Functioning of a Web Server
 - 9.4 Mail Server
 - 9.4.1 Types of E-mail Server
 - 9.4.2 Process of sending E-mails
 - 9.5 Operating System
 - 9.5.1 Windows
 - 9.5.2 Linux
 - 9.5.3 Linux vs. Windows
 - 9.6 Web Server Hardware
 - 9.6.1 Meaning of Hardware Servers
 - 9.6.2 Hardware used in Web Servers
 - 9.7 Web Server Software
 - 9.7.1 Features of Web Server Software
 - 9.8 Application Server Software
 - 9.9 Web Server & Application Server
 - 9.10 Web Site and Internet Utility Programs
 - 9.11 Let Us Sum Up
 - 9.12 Key Words
 - 9.13 Answers to Check Your Progress
 - 9.14 Terminal Questions
-

9.0 OBJECTIVES

After going through this unit, you will be able to:

- understand about web servers and its essentials;
- understand different operating systems;
- know about various types of utility programs; and
- differentiate between web server and application server.

9.1 INTRODUCTION

We subsist in a world where the community is totally reliant on smart phones and laptops. Just with a sheer internet connection, everything can be easy to get in a present scenario. Be it online shopping, e-commerce, procuring information, downloading music or movies, and social media, it's all at the moment a click away! But have you ever thought how it has become feasible?

The web server can refer to hardware or software, or both of them working in sync. On the hardware side, a web server is a computer or gadget or device that stores web server software and a website's component files. On the software side, a web server includes numerous parts that control how web user's admittance hosts files. The Web server includes the hardware, operating system, Web server software, TCP/IP protocols and site content (Web pages, images and other files). If the Web server is used within and is not exposed to the public, it is an "Intranet Server".

9.2 MEANING OF SERVER

A server is any computer used to present (or "serve") files or make programs available to other computers associated with it through a network (such as a LAN or a WAN). In computing, a server is a piece of computer hardware or software (computer program) that endows with functionality for other programs or devices, called "clients".



Figure 9.1: Servers

Archetypal servers are database servers, file servers, mail servers, print servers, web servers, game servers, and application servers. The software that the server computer uses to formulate these files and programs easy to get to the other computers is sometimes called server software. Sometimes this server software is integrated as part of the operating system that is running on the server computer. Thus, a few information systems professionals off the

record refer to the operating system software on a server computer as server software, a live out that adds substantial confusion to the use of the term "server".

We may occasionally use the terms server and web hosting interchangeably, though there are obviously varying levels of differences depending on which plan type you purchase. For example, if you purchase a shared hosting plan, talking about a physical server might include more than you have access to.

9.3 WEB SERVER ESSENTIALS

The foremost work of a Web server computer is to act in response to requests from Web client computers. The three main elements of a Web server are the hardware (computers and related components), operating system software, and Web server software.

It is well versed from the above term that the term web server can refer to hardware or software, or both of them working together. On the hardware side, a web server is a computer that stores web server software and a website's component files. On the software side, a web server includes several parts that control how web user's access hosted files. All three of these elements must work together to provide sufficient capacity in a given situation. We will discuss all these terms in a more elaborate manner in the coming sub head but prior to that let's talk about different types of web server.

9.3.1 Different Types of Web Server

1. **Static web server:** Static web server is a stack which consists of a computer (hardware) with an HTTP server (software). It is called as "static" because the server sends its hosted files as-is to your browser'
2. **Dynamic web server:** It consists of a static web server plus extra software, most commonly an application server and a database. It is called "dynamic" because the application server updates the hosted files before sending content to your browser via the HTTP server.

For example, to produce the final Web Pages you see in the browser, the application server might fill an HTML template with content from a database. Sites like MDN or Wikipedia have thousands of Web Pages. Typically, these kinds of sites are composed of only a few HTML templates and a giant database, rather than thousands of static HTML documents. This setup makes it easier to maintain and deliver the content. There are many other different types of servers, such as:

- **File server:** It is a computer and storage device dedicated to storing files. Any user on the network can store files on the server.

- **Print server:** It is a computer that manages one or more printers and a network server is a computer that manages network traffic.
- **Database server:** It is a computer system that processes database queries.

9.3.2 Characteristics of a Web Server

The web server has following characteristics:

- The primary function of a web server is to store, process and deliver web pages to clients.
- A web server can, in general, contain one or more websites.
- A web server processes incoming network requests over HTTP and several other related protocols.
- The web server process is an example of the client/server model.

9.3.3 Functioning of a Web Server

The main job of a web server is to display the website content. If a web server is not exposed to the public and is used internally, then it is called Intranet Server. When anyone requests for a website by typing the URL or web address on a web browser's (like Chrome or Firefox) address bar (like www.economictimes.com), the browser sends a request to the Internet for viewing the corresponding web page for that address. A Domain Name Server (DNS) converts this URL to an IP Address (For example 192.168.216.345), which in turn points to a Web Server.

The Web Server is requested to present the content of the website to the user's browser. All websites on the Internet have a unique identifier in terms of an IP address. This Internet Protocol address is used to communicate between different servers across the Internet. These days, Apache server is the most common web server available in the market. Apache is open source software that handles almost 70 percent of all websites available today. Most of the web-based applications use Apache as their default Web Server environment. Another web server that is generally available is Internet Information Service (IIS).

Check Your Progress A

1. Fill in the blanks with appropriate words:

- i) A is any computer used to present (or “serve”) files or make programs available to other computers associated with it through a network (such as a LAN or a WAN).
- ii) The foremost work of a Web server computer is to act in response to requests from computers.

- iii) web server is a stack which consists of a computer (hardware) with an HTTP server (software).
- iv) web server consists of a static web server plus extra software, most commonly an application server and a database.
- v) server is a computer and storage device dedicated to storing files. Any user on the network can store files on the server.

2. State whether the following are true or false.

- i) The three main elements of a Web server are the hardware (computers and related components), operating system software, and Web server software.
- ii) File server is a computer that manages one or more printers and a network server is a computer that manages network traffic.
- iii) Print server is a computer system that processes database queries.
- iv) Any computer can be turned into a Web server by installing server software and connecting the machine to the Internet.
- v) Static web server is a stack which consists of a computer (hardware) with an HTTP server (software).

3. What is a server?

.....
.....
.....
.....
.....

4. What are the three elements of a web server?

.....
.....
.....
.....
.....

9.4 Mail Server

A mail server (sometimes also referred to an e-mail server) is a server that handles and delivers e-mail over a network, usually over the Internet. A mail server can receive e-mails from client computers and deliver them to other mail servers. A mail server can also deliver e-mails to client computers.

Some examples of the most common free email servers and the format for their mail server addresses are given below:

- **AOL outgoing mail server-** smtp.aol.com.
- **Outlook incoming mail servers-** eas.outlook.com or imap-mail.outlook.com or pop-mail.outlook.com.
- **Outlook outgoing mail servers-** smtp-mail.outlook.com.

An email server (or mail server) is a digital postal service. It is a machine or application responsible for handling messages. In other words, an email server receives and delivers emails.

So, when you send an email, your message usually goes through a series of email servers until it reaches the recipient. The process is so fast and efficient that it looks simple, but there is a great deal of complexity behind sending and receiving emails. To avoid confusion, it is important to be clear that the term email server can have different meanings depending on the context. Sometimes an email server can mean a computer or a machine that has a complete system that includes different services or applications. At other times, the term email server can be used precisely as a synonym for some of these services or applications.

9.4.1 Types of E-mail Server

When we use the term email server in the sense of services or applications, we can separate email servers into 2 main categories: outgoing email servers and incoming email servers.

1. **SMTP:** Outgoing email servers are called SMTP servers. SMTP stands for Simple Mail Transfer Protocol. It is a set of communication guidelines that allow software to transmit an electronic mail over the internet. It is a program used for sending messages to other computer users based on e-mail addresses.

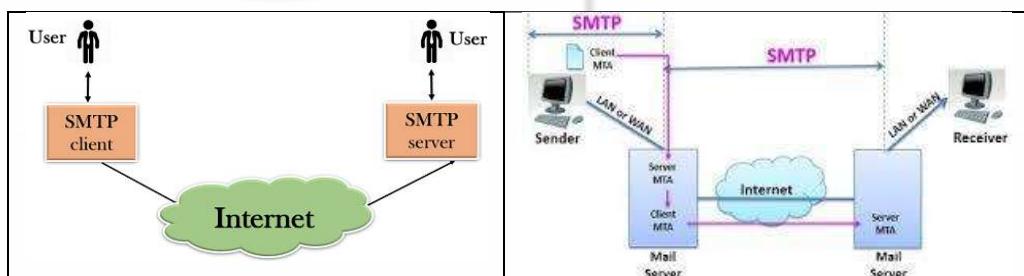


Figure 9.2: SMTP Servers

2. **POP3:** Incoming email servers are known by the acronyms POP3 (Post Office Protocol). In computing, the Post Office Protocol is an application-layer Internet standard protocol used by email clients to retrieve e-mail from a mail server. POP version 3 is the version in common use.
3. **IMAP (Internet Message Access Protocol):** IMAP (Internet Message Access Protocol) is a standard email protocol that stores email messages

on a mail server, but allows the end user to view and manipulate the messages as though they were stored locally on the end user's computing device(s).

In general, IMAP is more complex and flexible than POP3. With IMAP, messages are stored on the server itself. While with POP3, messages are usually kept on the device, that is, on your computer or cell phone.

9.4.2 Process of sending E-mails

To facilitate understanding, we have created a basic step-by-step process for sending email. It is a very simplified version, but it allows you to understand how an email is sent and delivered.

Step 1: Connecting to the SMTP server: When you send an email, your email service or provider, such as Gmail, Exchange, Office 365, and Zimbra, will connect to the SMTP server. That SMTP server is connected to your domain and has a specific address, such as `smtp.gatefy.com`. or `smtp.example.com`. At this stage, your email service will provide the SMTP server with some important information, such as your email address, the message body, and the recipient's email address.

Step 2: Processing the recipient's email domain: After connecting to the STMP server it will now identify and process the recipient's email address. If you are sending an email to someone else in your company, that is, to the same domain, the message will be directed directly to the IMAP or POP3 server. Otherwise, if you are sending the message to another company, for example, the SMTP server will need to communicate with that company's email server.

Step 3: Identifying the recipient's IP: At this stage, SMTP server will need to connect with DNS (Domain Name System) to find the recipient's server. The DNS works like a translation system. It will help to convert the recipient's domain into an IP address. By the way, the IP is a unique number that identifies a machine or server connected to the internet. SMTP needs IP to perform its function correctly, thus being able to direct the message to the recipient's server.

Step 4: Delivering the email: When the recipient receives the email, the SMTP checks the message and then directs it to the IMAP or POP3 server. The email then enters a queue and is processed until it is available for the recipient to access. There, now the email can be read.

9.5 OPERATING SYSTEM

In our preceding course BCOS-183 we had elaborately defined the term Operating system. An Operating System (OS) is an interface between computer user and computer hardware. The foundational software on a server is the operating system. Commonly speaking, it is the basis on which

everything else you use runs. Without an operating system, the server is just a collection of electronics that does not identify how to communicate with the rest of the humankind. An operating system is software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers. A web Server software must match with Operating System. Windows systems are usually used only by those who aim to use and therefore, to choose which Operating System to use, one must know about the Web Server software they choose. There are two types of operating systems commonly used for web servers, Windows and Linux/Unix.

9.5.1 Windows

Microsoft Windows, commonly referred to as Windows, is a group of several proprietary graphical operating system families, all of which are developed and marketed by Microsoft. Each family caters to a certain sector of the computing industry. If you use The Official Microsoft ASP.NET Site, MS SQL or Access databases you need Windows hosting because those technologies are not available on other platforms. The support for traditional Asp is better on Windows and ColdFusion hosting is most common on Windows servers, even though ColdFusion runs just as nice on Linux. On the downside, Windows servers are more exposed to viruses and hacker attacks. Windows hosting is also more expensive, and Windows servers tend to crash a bit more often. Windows also takes more server resources than Linux, resulting in fewer hosting accounts on each server and higher prices.



Figure 9.3: Windows

9.5.2 Linux

With Linux, one gets a stable server platform with high security and no threatening viruses. Linux is free, and does not take as much server resources as Windows, so Linux hosting is cheaper.

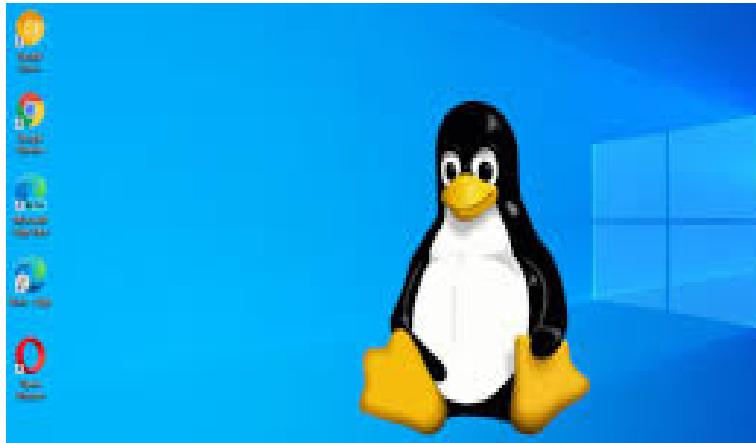


Figure 9.4: Linux

It provides a good selection of scripting languages (most are also supported by Windows servers). The most common database solution for Linux is MySQL, which also is open source and works great. PostGreSQL is on its way to Windows, but not quite there yet. And with the great selection of free online resources, Linux hosting is the best choice for most self-taught webmasters and businesses too. Ubuntu or Fedora was the most common choice.

9.5.3 Linux vs. Windows

Those seeking to privately operate a web server or rent one as a part of a web-hosting package through a provider are often confronted with a seemingly age old question: Linux or Windows? These two operating systems have dominated the web-hosting market for years and compete today for digital hegemony, with Linux maintaining a noticeable lead.

Due to the minimal differences between the two systems in terms of functions and applications, making a decision sometimes proves to be no easy feat. Taking a closer look at Windows and Linux is a task worth its while and allows users to more clearly understand the different advantages of both systems. Most of the time, such comparisons come down to a question of compatibility for applications. Looking into these various differences between Windows and Linux are stated below:

Table 9.1: Comparison between Windows and Linux

S. No	Windows	Linux
1.	It is a closed source software	It is a open source software
2.	It is a cost software	It is a free software
3.	It is less efficient	It is more efficient in comparison
4.	It is not customizable	It can be customized according to the needs
5.	Windows provides less security in comparison to Linux.	Linux provides more security in comparison to Windows
6.	It has high hardware cost	It has low hardware cost
7.	Windows does not provide much efficiency in hacking.	It is widely used in hacking purpose-based systems

9.6 WEB SERVER HARDWARE

1989, the first web server, known as CERN http, was created, along with a browser called World Wide Web. As we know that a web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to act in response to client requests made over the World Wide Web. The foremost situation of a web server is to exhibit website content through storing, processing and delivering web pages to users. Besides HTTP, web servers also hold up SMTP (Simple Mail Transfer Protocol) and FTP (File Transfer Protocol), used for email, file transfer and storage. If we go more into the relevance of a topic which focuses on a hardware perspective, it is a web server that stores web server software and a website's component files.

9.6.1 Meaning of Hardware Servers

A hardware server is the actual computer that stores the website data and delivers it to site visitors when they demand it by click on the website. These big computers are housed in datacenters that are manned by a gamut of security squad and other security measures such as video surveillance, CCTV monitoring in brick-and-mortar mode or cloud mode.

Planning for hardware capability necessitate focusing on the whole lot from server frame to network card, everything from making an accurate estimate of how much physical space one need to logical space and the connection infrastructure.

There is a big role of web server hardware as it facilitates in connecting to the internet and allows data to be exchanged with other connected devices, while web server software controls how a user accesses hosted file. Thus, for a very small company either it could be MSME, SME, a single computer can control the HTTP server along with an FTP server for file downloads, an SMTP server for email and other Internet-related functions. In a large company which has a multiple location and has cross border business, every service would run in one or more dedicated servers, and a gigantic website may require hundreds of servers to switch through Web hosting and cloud computing.

The three main hardware components to consider when choosing a web server are the CPU or processor, memory (RAM) and hard drive (storage). However, it is also important to consider other factors such as bandwidth, reliability, security, support, backups and other issues that help your server to run efficiently.

9.6.2 Hardware used in Web Servers

A static web server, or stack, consists of a computer (hardware) with an HTTP server (software). We identify it "static" for the reason that the server sends its hosted files as-is to your browser. A dynamic web server consists of a static web server plus extra software, most frequently an application server and a database.

Table 9.2: Hardware Specifications for Web Server

Large	Medium	Small
Supports up to 7500 concurrent users.	Supports up to 1000 concurrent users.	Supports up to 400 concurrent users.
1 TB of disk space for cache	500 GB of disk space for cache	200 GB of disk space for cache
16 CPU cores	12 CPU cores	8 CPU cores
64 GB RAM	32 GB RAM	16 GB RAM

9.7 WEB SERVER SOFTWARE

A web server software that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web. A web server software, dedicated to running this software, which can gratify client requests on the World Wide Web. Web servers can repeatedly be found embedded in devices such as printers, routers, webcams and serving only a local network.

On the software side, a web server includes several parts that control how web user's access hosted files. At a minimum, this is an HTTP server. An HTTP server is software that understands URLs (web addresses) and HTTP (the protocol your browser uses to view web pages). An HTTP server can be accessed through the domain names of the websites it stores, and it delivers the content of these hosted websites to the end user's device.

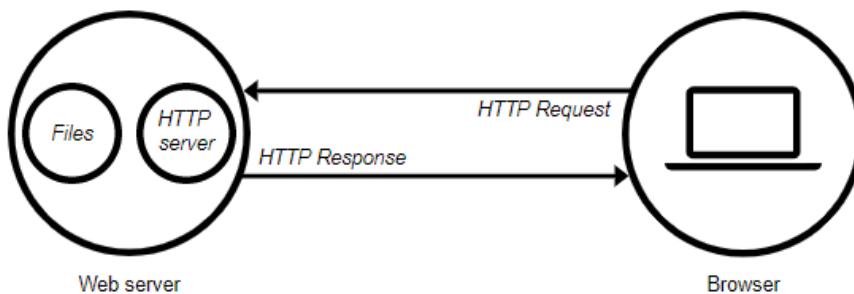


Figure 9.5: Web server and Browser

The web server may then be used as a part of a system for monitoring or administering the device in question. This typically means that no other software has to be installed on the client computer since only a web browser is obligatory (which now is incorporated with most operating systems). These web pages are more often than not static content that includes HTML documents, images, style sheets, tests etc. Apart from HTTP, a web server

also supports SMTP (Simple Mail transfer Protocol) and FTP (File Transfer Protocol) protocol for emailing and for file transfer and storage.

Web Stone is popular benchmarking software that measures performance on various types of Web pages (static and dynamic) such as:

- **HTML:** This is the standard static Web page containing only HTML tags.
- **CGI:** Common Gateway Interface or CGI protocol causes the Web server to run another program and return the result to the Web server.
- **API:** Application Programming Interface or API is a set of protocols that uses “multithreading” to handle user requests of the dynamic Web pages.

9.7.1 Features of Web Server Software

Various features of web server software are explained below:

- **Client Request Processing:** A Web server processes client requests that are sent using HTTP protocol, both for static and dynamic pages
- **IP-Sharing or Virtual Server:** A Web server can work as many virtual Web servers, serving many businesses with individual domain names but all domains directing to the same IP address of the computer.
- **Logical File:** A Web server can have a logical file name corresponding to a physical file. The physical file may be in the same computer or in another computer, and also the logical name and the physical name do not have to be the same. The Web server translates a logical URL into a physical file address.
- **Security:** Web servers are located publicly on the Internet or privately in an organizational intranet, usually behind the firewalls. The public documents are configured to be viewed by anonymous users. For extranet users, the files and folders are configured for validation of username and password. Access controls provide or deny access to files based on the username or by extranet company URL. Web servers allow processing digital certificates and private/public key pairs and also support Secure Socket Layer (SSL)
- **Site Management:** Web server provides tools to manage multiple Web sites, file security, virtual file, and log file analysis Administration of a Web server can be performed from a remote computer in the network Administrators can grant or deny Web access to individual computers, groups of computers, or entire domains. Administrators can stop and restart all Web services without stopping and restarting the computer Site management also include authoring tools such as Microsoft Front page 2000.
- **Application Development:** Application development includes Web editors and extensions to produce Web pages – either static or dynamic.

These include HTML editors such as FrontPage for static Web pages for dynamic Web pages, there are protocols such as Common Gateway Interface (CGI), Application programming Interface (API), and Active Server Pages (ASP) that are used by programs such as Java, C++, and VBScript to develop dynamic Web pages.

9.8 APPLICATION SERVER SOFTWARE

An application server is a server particularly designed to run applications. The "server" includes both the hardware and software that make available an environment for programs to run. Application servers are used for countless purposes such as, running web applications, hosting a hypervisor that manages virtual machines, etc. The various types of application software are explained below:

1. **IBM Server:** Power Systems is a family of server computers from IBM that are based on its POWER processors. These accelerated computing servers are built for modern analytics, high-performance computing HPC, and Artificial intelligence (AI).
2. **NGINX:** NGINX Unit is a dynamic application server, capable of running beside NGINX Plus and NGINX Open Source or standalone. NGINX Unit supports a RESTful JSON API, deploys configuration changes without service disruptions, and runs apps built with multiple languages and frameworks. Designed from scratch around the needs of your distributed applications, it lays the foundation for your service mesh.
3. **Tomcat:** Tomcat 3.x can be remotely caused to crash or shut down by a connection sending the right sequence of bytes to the AJP12 protocol port (TCP 8007 by default). Tomcat 3.x users are advised to ensure that this port is adequately firewalled to ensure it is not accessible to remote attackers. There are no plans to issue an update to Tomcat 3.x for this issue
4. **IIS 7.5:** Internet Information Services is extensible web server software created by Microsoft for use with the Windows NT family. IIS supports HTTP, HTTP/2, HTTPS, FTP, FTPS, SMTP and NNTP.
5. **vCenter Server:** vCenter Server is the centralized management utility for VMware, and is used to manage virtual machines, multiple ESXi hosts, and all dependent components from a single centralized location. VMware vMotion and svMotion require the use of vCenter and ESXi hosts.
6. **Oracle WebLogic:** Oracle WebLogic Server is a Java EE application server currently developed by Oracle Corporation. Oracle acquired WebLogic Server when it purchased BEA Systems in 2008.

7. **LiteSpeed Web Server:** LiteSpeed Web Server is proprietary web server software. It is the 5th most popular web server, estimated to be used by 6.4% of websites as of April 2020. LSWS is developed by privately held LiteSpeed Technologies
8. **Apache:** Apache Tomcat is an open-source application server that executes Java Servlets, renders and delivers web pages that include JavaServer Page code, and serves Java Enterprise Edition (Java EE) applications. Released in 1998, Tomcat is the most widely used open-source Java application server.

9.9 WEB SERVER & APPLICATION SERVER

Despite the contrast implied by “application server vs. web server,” on the Internet the two types of server are usually deployed together for a common purpose: fulfilling user requests for content from a website. There are no standard documents that define the properties of web servers and application servers, but let’s look at how the terms are commonly understood.

A web server’s fundamental job is to accept and fulfill requests from clients for static content from a website (HTML pages, files, images, video, and so on). The client is almost always a browser or mobile application and the request takes the form of a Hypertext Transfer Protocol (HTTP) message, as does the web server’s response.

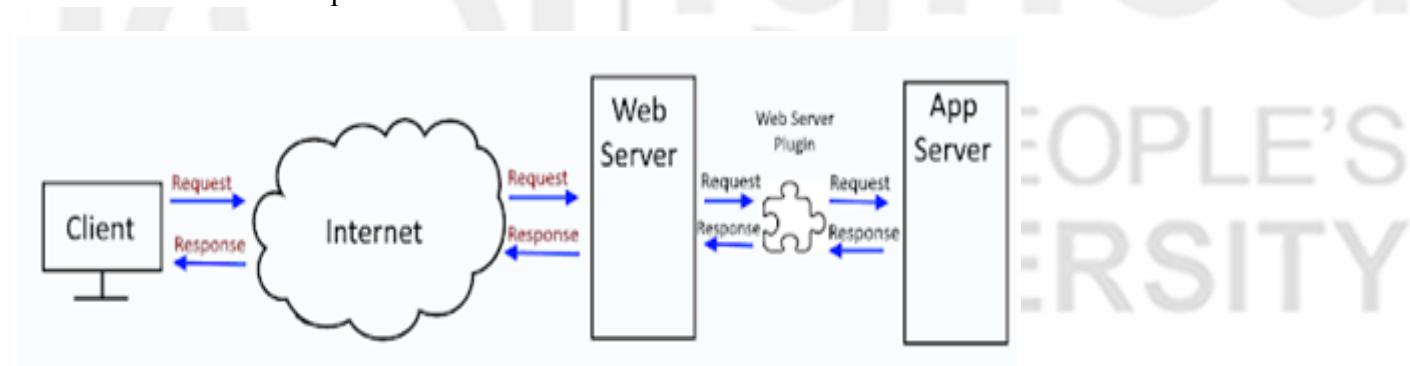


Figure 9.6: Web Server and App server

An application server’s fundamental job is to provide its clients with access to what is commonly called business logic, which generates dynamic content; that is, it’s code that transforms data to provide the specialized functionality offered by a business, service, or application. An application server’s clients are often applications themselves, and can include web servers and other application servers. Communication between the application server and its clients might take the form of HTTP messages, but that is not required as it is for communication between web servers and their clients. Many other protocols are popular, including the variants of CGI.

Table 9.2: Difference between Web server and Application server

S. No	Web Server	Application Server
1.	It is a server that handles HTTP protocol.	It is a server that exposes business logic to client applications through various protocols including HTTP.
2.	It is used to serve web-based applications.	It is used to serve web-based applications and enterprise-based applications.
3.	It encompasses web containers only.	It encompasses Web container as well as EJB container.
4.	It is useful or fitted for static content.	It is fitted for dynamic content.
5.	It consumes or utilize less resources.	It utilizes more resources.
6.	These arrange the run environment for web applications.	These arrange the run environment for enterprise applications.
7.	In web servers, multithreading is not supported.	In the application server, multithreading is supported.
8.	Their capacity is lower than application server.	Their capacity is higher than web server.
9.	In web servers, HTML and HTTP protocols are used.	In application servers, GUI as well as HTTP and RPC/RMI protocols are used.

9.10 WEB SITE AND INTERNET UTILITY PROGRAMS

To run any software and work on different programs, on a computer system, one needs the operating system to work smoothly. Utility programs, as the name suggests not only help in executing various crucial tasks for the operating system but also help in overall maintenance of the system. Utility software helps to manage, maintain and control computer resources. Examples of utility programs are antivirus software, backup software and disk tools. A device driver is a computer program that controls a particular device that is connected to the computer. There are many programs that are used with Web server software. Some of these programs are on the server, while some are on the computer being used by the Web designer. One of the most used Internet utility programs is e-mail. Electronic mail (e-mail) is a process, by which digital information can be sent, received, forwarded, and stored using telecommunications networks. Using the Internet, e-mail can be transmitted outside of corporate networks. Messages can also be sent to bulletin boards.

About Utility Program

Utility program is a system application that executes a specific task, generally pertaining to optimal maintenance or operation of the system resources. Operating systems such as Windows, macOS and Linux come with their own set of utility programs to maintain and execute different utility functions such as formatting, compressing, scanning, exploring and much more. Utility programs also assist with the management of computer functions, resources and files. one can ensure complete password protection and keep systems virus free using different utility programs.

9.10.1 Types of Utility Programs

Various functions are executed by a utility program to make the system's operations smoother and more efficient. Overall, utility programs can be broadly categorized into four parts:

1. **System Utilities:** Some of the system utility programs are memory manager, antivirus and firewall, registry checker and cleaner, package installer and explorer. Also, with the help of such system utility programs, users can execute functions that are crucial for smooth running of an operating system.
2. **File Management Utilities:** File management utilities include tools such as data archives, software backup tools, file compression tools and managers. With the help of these, users can manage their data in the form of files and folders. These utilities help users to sort out, store and categories files according to the requirement.
3. **Storage Device Management Utilities:** Storage device management utility programs provide solutions for enhancing disk capacity, such as disk clean-up, partition management, formatting, disk space allocation, defragmentation, etc. With the help of this utility program, users can compartmentalize systems and external drives for efficient management of programs and files that are stored within.
4. **Miscellaneous Utilities:** Apart from these three utility program categories, there are various other programs that help in managing business operations. Some of these programs include data generators, HTML checkers and hex editors, to name a few.

Check Your Progress B

1. Fill in the blanks with appropriate words:

- i) An is an interface between computer user and computer hardware.
- ii) is a group of several proprietary graphical operating system families, all of which are developed and marketed by Microsoft.
- iii) Computer includes the physical parts of a computer, such as the case, central processing unit, monitor, mouse and others.
- iv) is a server that exposes business logic to client applications through various protocols including HTTP.
- v) utilities include tools such as data archives, software backup tools, file compression tools and managers.

2. State whether the following are true or false.

- i) Windows server is more exposed to viruses and hacker attacks.

- ii) A web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web.
 - iii) Web server encompasses Web container as well as EJB container.
 - iv) Utility program is a system application that executes a specific task, generally pertaining to optimal maintenance or operation of the system resources.
 - v) With the help of file management utility programs, users can execute functions that are crucial for smooth running of an operating system.
3. What is an electronic mail?

.....
.....
.....
.....
.....

4. What are the four types of utility programs?

.....
.....
.....
.....

9.11 LET US SUM UP

A server is any computer used to present (or “serve”) files or make programs available to other computers associated with it through a network (such as a LAN or a WAN). In computing, a server is a piece of computer hardware or software (computer program) that endows with functionality for other programs or devices, called "clients".

The foremost work of a Web server computer is to act in response to requests from Web client computers. The three main elements of a Web server are the hardware (computers and related components), operating system software, and Web server software.

An Operating System (OS) is an interface between computer user and computer hardware. The foundational software on a server is the operating system. Commonly speaking, it's the basis on which everything else you use runs. There are two types of operating systems commonly used for web servers, Windows and Linux/Unix. Computer hardware includes the physical parts of a computer, such as the case, central processing unit, monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and

motherboard. A web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web. A web server is server software, or hardware dedicated to running this software, that can gratify client requests on the World Wide Web.

Web server is a server that handles HTTP protocol whereas application server is a server that exposes business logic to client applications through various protocols including HTTP. Web server is used to serve web-based applications (i.e. servlets and jsps) whereas application servers are used to serve web based applications and enterprise based applications (i.e. servlets, jsps and ejbs). It may contain a web server internally.

Utility program is a system application that executes a specific task, generally pertaining to optimal maintenance or operation of the system resources. Various functions are executed by a utility program to make the system's operations smoother and more efficient. Overall, utility programs can be broadly categorized into four parts namely; system utilities, file management utilities, storage device management utilities and miscellaneous utilities.

9.12 KEY WORDS

Application server: It is a server that exposes business logic to client applications through various protocols including HTTP.

Database server: It is a computer system that processes database queries.

Dynamic web server: It consists of a static web server plus extra software, most commonly an application server and a database. It is called "dynamic" because the application server updates the hosted files before sending content to your browser via the HTTP server.

File server: It is a computer and storage device dedicated to storing files. Any user on the network can store files on the server.

Hardware: Hardware includes the physical parts of a computer, such as the case, central processing unit, monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and motherboard.

Operating System: An Operating System (OS) is an interface between computer user and computer hardware.

Print server: It is a computer that manages one or more printers and a network server is a computer that manages network traffic.

Server: A server is any computer used to present (or "serve") files or make programs available to other computers associated with it through a network (such as a LAN or a WAN). In computing, a server is a piece of computer hardware or software (computer program) that endows with functionality for other programs or devices, called "clients".

Static web server: It is a stack which consists of a computer (hardware) with an HTTP server (software). It is called as “static” because the server sends its hosted files as-is to your browser’

Utility program: It is a system application that executes a specific task, generally pertaining to optimal maintenance or operation of the system resources.

Web server: It is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web.

Windows: It is a group of several proprietary graphical operating system families, all of which are developed and marketed by Microsoft.

9.13 ANSWER TO CHECK YOUR PROGRESS

Check Your Progress A

1. (i) Server (ii) web client (iii) static (iv) dynamic (v) file
2. (i) True (ii) False (iii) False (iv) True (v) True

Check Your Progress B

1. (i) Operating system (ii) Windows (iii) hardware (iv) application server (v) file management
2. (i) True (ii) True (iii) False (iv) True (v) False

9.14 TERMINAL QUESTIONS

1. What are the different types of web servers?
2. What is a mail server? What are different types of E-mail servers?
3. Explain various steps of sending an E-mail
4. What is an operating system? Explain the two most commonly used operating systems.
5. Explain web server software.
6. What are the various features of web server software?
7. Differentiate between web server and application server.
8. What are utility programs? What are the different types of utility programs?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

BLOCK 4

Cyber Security and IT Act



BLOCK 4: CYBER SECURITY AND IT ACT

This is the fourth block of the course “E-Commerce”. This block makes the learners familiarize with cyber security, various measures for cyber security, various types of cyber crimes and threats as well as the various highlights of the IT Act. This block is structured to explain the various terminologies related to the cyber word and to understand the various provisions granted under IT Act to aid them when in need. The block on the theme “Cyber Security and Information Act” comprises of three units, the detail of which is mentioned below:

- **Unit-10:** This unit helps the learners to understand the basic terminologies of the cyber world. The unit briefs about the overview of cyber security, how it is different from the information security. The later part of the unit focuses on various types of prevalent cyber threats, cyber crimes, cyber laws and security barriers.
- **Unit-11:** This unit familiarizes the learners about various vulnerable information on the internet such as, malicious software, wireless security challenges, hackers and computer crimes etc. The later part of the unit briefs on the various measures for securing the business or the network transactions along with their various ways of enforcement.
- **Unit-12:** This unit makes the learners aware of the IT Act 2000 along with its various amendments and provisions over time. After studying this unit learners will also be able to understand about the digital signatures, their procedure, working and legal position, cyber crimes, Appellate tribunal, encryption etc.

UNIT 10 CYBER SECURITY

Structure

- 10.0 Objectives
- 10.1 Introduction
- 10.2 Meaning of Cyber Security
 - 10.2.1 Cyber Security Impact on E-Commerce
 - 10.2.2 Cyber Security Relevance
- 10.3 Information Security V/s Cyber Security
- 10.4 Basics of Cyber world
 - 10.4.1 Internet and World Wide Web
 - 10.4.2 Evolution of World Wide Web
 - 10.4.3 Cyberspace
 - 10.4.4 Cyber Security
- 10.5 Need & Concepts behind Security
 - 1.5.1 Why is Cyber Security Important?
- 10.6 IoT and Cyber World
 - 10.6.1 Cyber Threats
 - 10.6.2 Types of Threats
- 10.7 Cyber Crime and Law
- 10.8 Security Barriers
- 10.9 Let Us Sum Up
- 10.10 Key Words
- 10.11 Answers to Check Your Progress
- 10.12 Terminal Questions

10.0 OBJECTIVES

After completing this unit, you will be able to:

- differentiate between information security and cyber security;
- understand basic terminologies related to cyber world;
- understand cyber threats and its types; and
- understand cyber crime and law.

10.1 INTRODUCTION

Nowadays usage of smart phone and gadgets is a common thing. It is one of the most noteworthy stuff that is required to be taken under consideration before deeply looking into cyber and its usages. In present scenario cyber

and it's security becoming an essential component of our life because all the data pertains to testimonials, health information, personal information, financial information are stored in the internet and web which in present scenario we call it a cloud. Putting information on virtual platform make all of us familiar all around the world to transform how we connect with others, organize the flow of things, and share information.

It is a place where the data will stay forever but it is not that secured until security is provided to it. In the present scenario Artificial intelligence (AI) has been introduced mutually, AI and the Internet of Things (IoT) will transform both the Internet and the global economy. Within the next five years, we can anticipate AI and Machine learning (ML) to become imbedded in all forms of technology that incorporate data exchange and analysis.

Most of us are always connected to internet each day via smart phones, laptop, home router, smart TV, high end cars, DVR and camera etc., While being connected to internet gives us the prospect to shop online, watch a movie, enjoy music, use maps, search online, pay our bills etc., but with the advent of IoT (Internet of Things) even more gadgets are getting connected like bulbs, thermostat, air conditioners etc. Unfortunately, many of these connected devices will not be designed with security in mind leading to new cyber problems for everyone.

Computer security and cyber security are the protection of computer systems from theft or damage to their hardware, software or electronic data, as well as from disruption of the services they make available. Cyber security is becoming an imperative characteristic of life and the reason behind this kind of approach is nothing but the development of technical reliance. Cyber Security is a specialized field in Information Technology (IT) which is regarded as a sub stream in Computer Science.

This unit on Cyber Security provides aims to equip learners with the knowledge and skills required to look after the computer operating systems, networks and data from cyber-attacks. It has a vast usage in E-commerce both as learning as well as its implementation due to the massive financial implications usage with the help of a technology.

10.2 MEANING OF CYBER SECURITY

Cyber threats are a global risk that governments, the private sector, non-governmental organizations – and the global community as a whole – must deal with. Computer security, cyber security or information technology security is the protection of computer systems and networks from information disclosure, theft of or damage to their hardware, software, or electronic data, as well as from the disruption or misdirection of the services they provide. The field is becoming gradually more noteworthy due to the amplified reliance on computer systems, the Internet and wireless network standards such as Bluetooth and Wi-Fi, and due to the growth of "smart" devices, including Smartphone, televisions, and the various devices that constitute the "Internet of things".

Today's world is more about the e-commerce in which precautionary measure need to be taken to safeguard ourselves with a cyber. Keeping in mind cyber security is the way of practicing or rather protecting systems, networks, and programs from digital attacks. These cyber-attacks are frequently aimed at accessing, changing, or destroying susceptible information; extorting money from users; or interrupting normal business processes. Implementing effective cyber-security measures is predominantly challenging nowadays because there are more devices than people, and attackers are becoming more innovative in using state-of-art tools in order to indulge in malpractices and threatening electronically.

10.2.1 Cyber Security Impact On E-Commerce

Cyber security is that part of protection within a business, or organization that is focused on enabling the authorized use of IT systems, at the same time as preventing unauthorized access. The main aim of cyber security is to help make the business more successful. This can involve strategies that enhance confidence with shareholders, customers and stakeholders, through to prevent damage to the business brand, actual losses and business disruptions. Cyber security should be applied to computing devices, such as desktops, servers, laptops, notebooks, smart phones and networks. The field includes all the processes and mechanisms by which digital equipment, information and services are protected from un-intended or unauthorized access, change, or destruction and are of growing importance due to the increasing reliance on computer systems in most societies. Professional cyber security consultants note that it is very rare to find an organization whose data is not compromised in some way. In cyber security circles the acronym C.I.A. sums up the major ways in which data can be at risk.

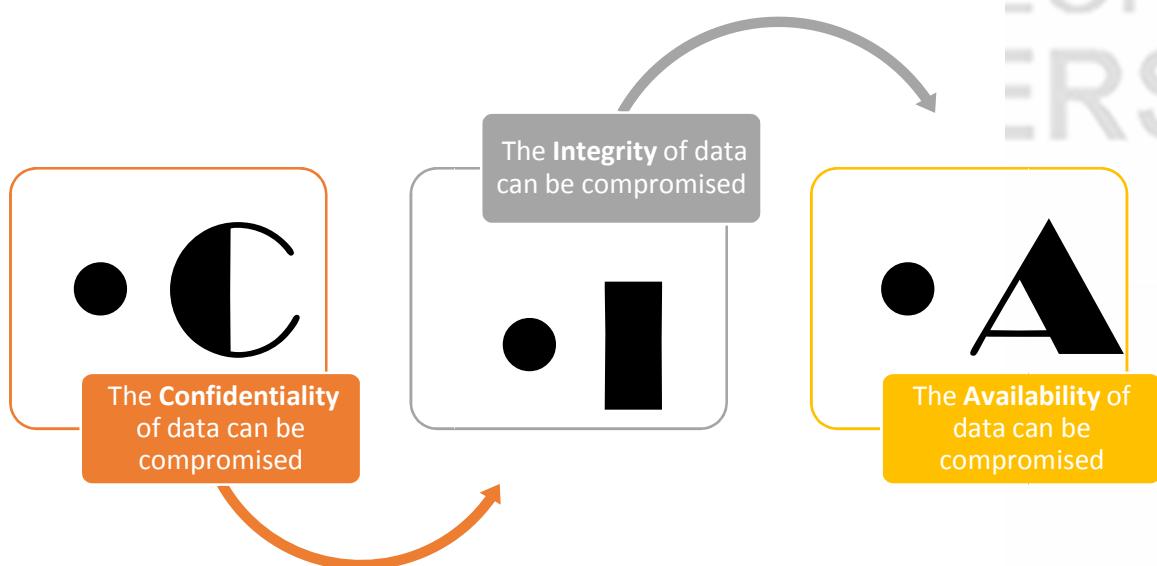


Fig 10.1: C.I.A.

Any three can cause massive fallout to business, particularly those that conduct some of their business online. As cyber security grows in importance in many organizations, professionals that understand how cyber security

objectives interface with broader organizational goals will be increasingly important.

10.2.2 Cyber Security Relevance

Cyber Security is particularly relevant to the following:

- Enabling the safe use of internet connected services, smart devices & communication systems.
- Enabling the safe use of all IT controlled business functions, critical national infrastructures.
- Detection and prevention of unauthorized access.
- Availability of IT systems and Cloud services.
- Secure storage of customers' private and intimate information and data.
- Legal and regulatory compliance.

The content covered in this unit will provide enough detail to understand the role of cyber security and other related security functions within the existing world.

10.3 INFORMATION SECURITY V/S CYBER SECURITY

These two words “Cyber Security” and “Information Security” are generally used as synonyms in security terminology, and create a lot of confusion among security professionals. Some of information security professionals think that cyber security is subset of information security while others think the opposite. So, to clear this confusion, let's start with data security. Data security is all about securing data. Now another question arises here is to the difference between data and information. Not every data can be information. Data can be called as information when it is interpreted in a context and given meaning. For example, “14041989” is data. And if we know that this is Date of Birth (DOB) of a person, then it is information. So, Information means data which has some meaning, and Information security (also known as InfoSec) is all about protecting the information, which generally focus on the confidentiality, integrity, availability (CIA) of the information. The components of the CIA are:

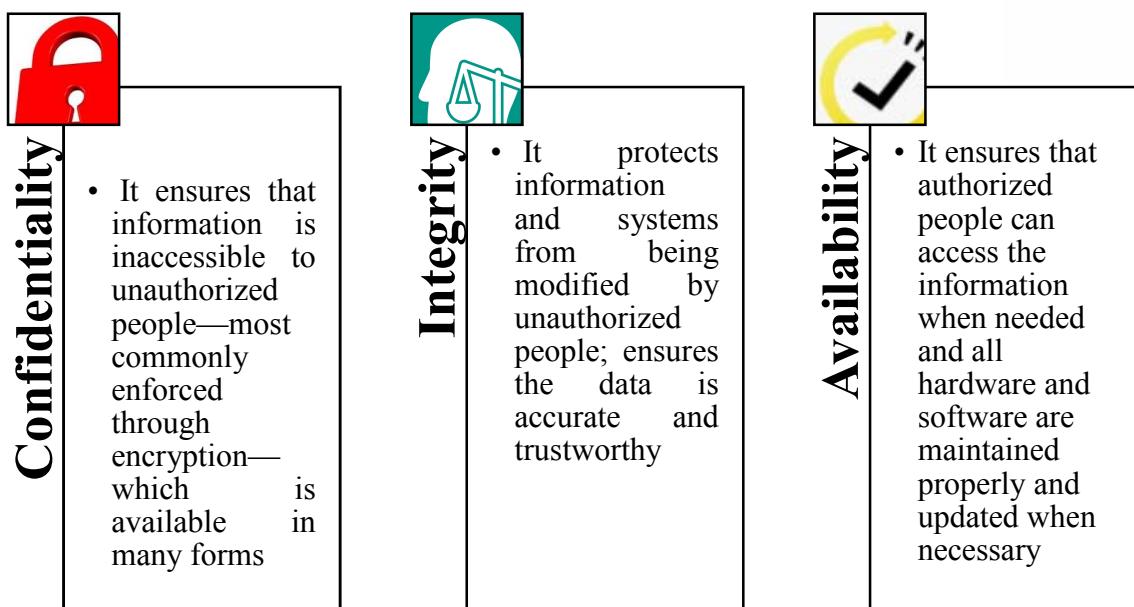


Fig 10.2: Components of the CIA

The CIA combination has become the de facto standard model for keeping the organization secure. The three fundamental principles help build a vigorous set of security controls to preserve and protect your data.

Information security ensures that both physical and digital data is protected from unauthorized access, use, disclosure, disruption, modification, inspection, recording or destruction. Information security differs from cyber security in that InfoSec aims to maintain the security of data in any form. Whereas cyber security protects only digital data i.e., cyber security is about securing things that are vulnerable through ICT. It also considers where data is stored and which technologies are used to secure the data i.e., Cyber security is a subset of information security, and it is the practice of defending your organization's networks, computers and data from unauthorized digital access, attack or damage by implementing various processes, technologies and practices.

One more comparison need attention i.e., Cyber Security and Computer Security, both terms are distant apart. Though both are related and sounds alike, but they are two different terms. Computer security generally includes the security of computer parts like computer hardware and it also deals with the backup of the information stored in the computer, whereas Cyber is a lot more complicated and wider field. It deals with all the threats that can be caused in the Cyber (computer- online and offline) world. Let it be viruses, stealing your personal information, frauds caused by cyber criminals and many more things are taken into consideration. If your business is starting to develop a security program, information security is where you should first begin, as it is the foundation for data security.

10.4 BASICS OF CYBER WORLD

As we know that Cyber security's history began with a research project during the 1970s, on what was then known as the ARPANET (The Advanced Research Projects Agency Network). A researcher named Bob Thomas created a computer program which was able to move ARPANET's network, leaving a small trail wherever it went. The Cyber World, or cyberspace, is more than just the Internet. It refers to an online environment where many participants are involved in social interactions and have the ability to affect and influence each other. People interact in cyberspace through the use of digital media.

10.4.1 Internet and World Wide Web

Now, the next level of understanding for cyber security requires understanding the difference between Internet and WWW (World Wide Web). Most of the people use the words Internet and WWW interchangeably. In fact, they don't see any difference between the two. Only some of the curious folks ask about the difference between Internet and WWW. They wonder if both these things are same. If not, then what are the differences between the two? The quick answer is that technically Internet and WWW are not the same things, and in this section, we will understand the major differences between these two terms.

The Internet: Internet is a massive network of networks. It is essentially an interconnection between millions of smaller computer networks scattered around the globe. These networks are connected with each other by the means of over ground cables, underground cables, satellite links and sub-oceanic cables etc. The word "Internet" actually refers to the entire hardware infrastructure present in the network. Such hardware includes computer systems, routers, cables, bridges, servers, cellular towers, satellites and other pieces. All these pieces of hardware operate under the Internet Protocol (IP). Different computing devices in the Internet are identified by their IP addresses.

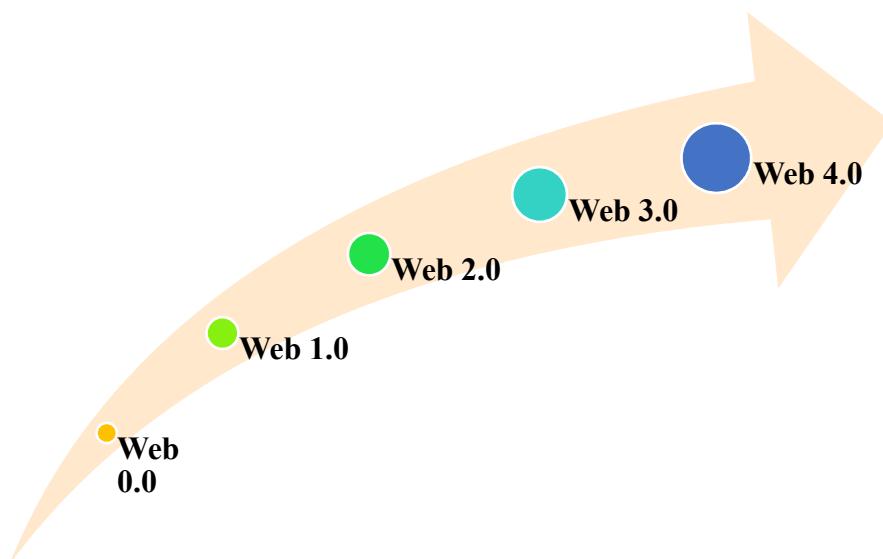
World Wide Web (WWW): In the course of life, when people say "Internet", most of the time they actually refer to the World Wide Web or the WWW. The WWW is the collection of all the information that is available in the Internet. So, all the text, images, audio, videos online forms the www. Most of this information is accessed through websites and we identify websites by their domain names. There is huge amount of information available in the WWW. Only a tiny part of this information is searchable through popular search engines like Google. However, most of the information lies in the Deep Web and Dark Web. WWW uses http protocol to access the information from various servers. Information is sent as web pages which are organized in the form of websites. Various web pages are interlinked with each other through hyperlinks. Web pages and other pieces of information in WWW are identified by their address. The following table lists the major differences between the two terms.

Table 10.1 Differences between Internet and WWW

S.No.	INTERNET	WWW
1.	Internet originated sometimes in late 1960s.	English scientist Tim Berners-Lee invented the World Wide Web in 1989
2.	Nature of Internet is hardware.	Nature of WWW is software.
3.	Internet consists of computers, routers, cables, bridges, servers, cellular towers, satellites etc.	WWW consists of information like text, images, audio, video
4.	The first version of the Internet was known as ARPANET	In the beginning WWW was known as NSFNET
5.	Internet works on the basis of Internet Protocol (IP)	WWW works on the basis of Hyper Text Transfer Protocol (HTTP)
6.	Internet is independent of WWW	WWW requires the Internet to exist
7.	Internet is superset of WWW	WWW is a subset of the Internet. Apart from supporting www, the Internet's hardware infrastructure is used for other things as well (e.g., FTP, SMTP)
8.	Computing devices are identified by IP Addresses	Information pieces are identified by Uniform Resource Locator (URL)

10.4.2 Evolution of World Wide Web (WWW)

This World Wide Web is evolved from web 0.0 web 1.0 web 2.0, web 3.0, and now web 4.0, following are the briefs for each generation:

**Fig 10.3: Evolution of World Wide Web**

1. **Web 0.0 (Developing the internet):** This phase referred to the developmental phase of internet.
2. **Web 1.0 (The shopping carts & static web):** Experts call the Internet before 1999 “Read-Only” web. The average internet user’s role was limited to reading the information which was presented to him.

According to Tim Berners-Lee the first implementation of the web, representing the Web 1.0, could be considered as the “read-only web.”

3. **Web 2.0 (The writing and participating web):** The lack of active interaction of common users with the web lead to the birth of Web 2.0. This era empowered the common user with a few new concepts like Blogs, Social-Media & Video-Streaming.
4. **Web 3.0 (The semantic executing web):** The Web 3.0 would be a “read-write-execute” web.
5. **Web 4.0 (Mobile Web):** The next step is not really a new version, but is an alternate version of what we already have. We needed to adapt to its mobile surroundings. Web 4.0 connects all devices in the real and virtual world in real-time.
6. **Web 5.0 (Open, Linked and Intelligent Web = Emotional Web):** “The next web”. Although Web 5.0 still is in developing mode and the true shape is still forming, first signals are in that Web 5.0 will be about a linked web which communicates with us like we communicate with each other (like a personal assistant). Web 5.0 is called “symbiotic” web. This Web will be very powerful and fully executing. Web 5.0 will be the read-write-execution-concurrency web. Web 5.0 will be about the (emotional) interaction between humans and computers. The interaction will become a daily habit for a lot of people based on neuro technology. For the moment web is “emotionally” neutral, which means web does not perceive the users feel and emotions. This will change with web 5.0 – emotional web. One example of this is www.wefelfine.org, which maps emotions of people. With headphones on, users will interact with content that interacts with their emotions or changes in facial recognition.

As the bandwidth requirements of WWW are increasing, more and more users are getting connected to the WWW through their smart gadgets and hence the addressing of these gadgets over www is utmost important, the connection less addressing protocol used to track device over WWW is your Internet Protocol (IP)?

IP (short form of Internet Protocol) specifies the technical format of packets and the addressing scheme for computers to communicate over a network. Most networks combine IP with a higher-level protocol called Transmission Control Protocol (TCP), which establishes a virtual connection between a destination and a source. IP by itself can be compared to something like the postal system. It allows you to address a package and drop it in the system, but there's no direct link between you and the recipient. TCP/IP, on the other hand, establishes a connection between two hosts so that they can send messages back and forth for a period of time.

Upcoming technologies like IoT (Internet of Things), Blockchain, Cloud Computing etc., are result of the continuous increase in the bandwidth requirement of WWW, thus more and more devices are getting connected to the internet/www. Now, to identify these devices uniquely, IP addressing also

requires attention. Thus, to address these increasing number of devices over internet(www) it is required to move from IPV-4 (internet protocol version-4) to IPV-6 (internet protocol version-6), because IPV-6 protocol has capability to address more devices. This IPv6 is the next generation Internet Protocol (IP) standard intended to eventually replace IPv4, the protocol many Internet services still use today. Every computer, mobile phone, and any other device connected to the Internet needs a numerical IP address in order to communicate with other devices. The original IP address scheme, called IPv4, is running out of addresses, because IPv4 uses a 32-bit address scheme allowing for a total of 2^{32} addresses (just over 4 billion addresses). Whereas IPv6 addresses are 128-bit IP address written in hexadecimal and separated by colons, thus it caters large number of devices and hence quite appropriate for the current technological needs.

10.4.3 Cyberspace

Now because of increasing number of devices over WWW and increasing bandwidth of WWW, more and more users are getting connected to WWW, which increases the possibility of security breach and threats from the cyber world, thus we need cyber security and to understand what is meant by ‘cyber security’ it is helpful to begin by looking at a definition of cyberspace.

Cyberspace is an interactive domain made up of digital networks that is used to store, modify and communicate information. It includes the internet, but also the other information systems that support our companies, infrastructure and services. Cyberspace can be divided into a multi-layer model comprised of:

1. **Physical foundations:** such as land and submarine cables, and satellites that provide communication pathways, along with routers that direct information to its destination.
2. **Logical building blocks:** including software such as smart phone apps, operating systems, or web browsers, which allow the physical foundations to function and communicate.
3. **Information:** that transits cyberspace, such as social media posts, texts, financial transfers or video downloads. Before and after transit, this information is often stored on (and modified by) computers and mobile devices, or public or private cloud storage services.
4. **People:** It manipulates information, communicate, and design the physical and logical components of cyberspace.

Collectively these tangible and intangible layers comprise cyberspace, which we are increasingly dependent on essential components of daily life. A dependable and stable cyberspace is necessary for the smooth functioning of critical infrastructure, which comprise of software, hardware and networks.

10.4.4 Cyber Security

Cyber security is the protection of computer systems from theft or damage to their hardware, software or electronic data, as well as from disruption or misdirection of the services they provide. It can be classified into three categories:

- 1) **Information Security:** Information security aims to protect the users' private information from unauthorized access and identity theft. It protects the privacy of data and hardware that handle, store and transmit that data. Examples of Information security include User Authentication and Cryptography.
- 2) **Network Security:** Network security aims to protect the usability, integrity, and safety of a network, associated components, and data shared over the network. When a network is secured, potential threats gets blocked from entering or spreading on that network. Examples of Network Security includes Antivirus and Antispyware programs, Firewall that block unauthorized access to a network and VPNs (Virtual Private Networks) used for secure remote access.
- 3) **Application Security:** Application security aims to protect software applications from vulnerabilities that occur due to the flaws in application design, development, installation, and upgrade or maintenance phases.

Just to have basic understanding of the cyber world, one should have fundamental acquaintance with the basic terms of cyber space, some of the most important cyber security terminologies that one should know are as follows:

1. **Cloud:** A technology that allows us to access our files and/or services through the internet from anywhere in the world. Technically speaking, it is a collection of computers with large storage capabilities that remotely serve requests.
2. **Software:** A set of programs that tell a computer to perform a task. These instructions are compiled into a package that users can install and use. For example, Microsoft Office is an application software.
3. **Domain:** A group of computers, printers and devices that are interconnected and governed as a whole. For example, your computer is usually part of a domain at your workplace.
4. **Virtual Private Network (VPN):** A tool that allows the user to remain anonymous while using the internet by masking the location and encrypting traffic.
5. **IP Address:** An internet version of a home address for your computer, which is identified when it communicates over a network; For example, connecting to the internet (a network of networks).
6. **Exploit:** A malicious application or script that can be used to take advantage of a computer's vulnerability.

7. **Breach:** The moment a hacker successfully exploits vulnerability in a computer or device, and gains access to its files and network.
8. **Firewall:** A defensive technology designed to keep the bad guys (cyber threats) out. Firewalls can be hardware or software-based.
9. **Malware:** An umbrella term that describes all forms of malicious software designed to wreak havoc on a computer. Common forms include; viruses, trojans, worms and ransomware as covered in a following heads.
 - i. **Virus:** A type of malware aimed to corrupt, erase or modify information on a computer before spreading to others. However, in more recent years, viruses like Stuxnet have caused physical damage.
 - ii. **Ransom ware:** A form of malware that deliberately prevents you from accessing files on your computer – holding your data hostage. It will typically encrypt files and request that a ransom be paid in order to have them decrypted or recovered. For example, WannaCry Ransom ware. For more information on Ransomware, check out our free Ransomware Guide.
 - iii. **Trojan horse:** A piece of malware that often allows a hacker to gain remote access to a computer through a “back door”.
 - iv. **Worm:** A piece of malware that can replicate itself in order to spread the infection to other connected computers.
 - v. **Bot/Botnet:** A type of software application or script that performs tasks on command, allowing an attacker to take complete control remotely of an affected computer. A collection of these infected computers is known as a “botnet” and is controlled by the hacker or “bot-herder”.
 - vi. **DDoS:** An acronym that stands for distributed denial of service – a form of cyber-attack. This attack aims to make a service such as a website unusable by “flooding” it with malicious traffic or data from multiple sources (often botnets).
 - vii. **Phishing or Spear Phishing:** A technique used by hackers to obtain sensitive information. For example, using hand-crafted email messages designed to trick people into divulging personal or confidential data such as passwords and bank account information.

This is just a brief intro of various terms. We will discuss many more concepts in the coming sections of this unit.

10.5 NEED AND CONCEPT BEHIND SECURITY

To help and explain “why security knowledge is so important?” let's first establish the baseline of how daily life operates for most of us. "There aren't many careers left that aren't based on technology, nowadays even teachers in

classrooms are using Smart boards, and many a times someone who comes to your home to do contract work will whip out a smart phone or tablet and add information to an app on the spot, something as small as clicking attachments in emails without knowing if they are safe or there are many more incidences where we need to understand that how such things can affect our security. The mistakes that cause the most damage at companies are security related, of course, security concerns don't stay at work.

We need to understand that "how basic security knowledge can help any career?" Aside from simply not clicking suspicious email attachments, there are things nearly all employees can do to enhance company security and make themselves more valuable workers. Within any role in the organization, learning about security can help an individual understand the risks and make informed decisions for their key stakeholders, here are a few examples:

- In sales, reassure customers of an organization's security posture.
- In corporate communications, you should assess in the context of business reputation and brand trust.
- The legal team should ensure that the right security clauses are built into supplier and customer contracts.
- Regarding HR and/or security, know what's needed for better security awareness and training.
- Product managers should advise on good security features.
- In engineering development, make sure you develop secure code.
- Security professionals should perform reviews and quality assurance tests for functional and security verification.
- Corporate management should ensure that a good security incident response plan is in place to address any vulnerability.

As you can see, it certainly doesn't require being a security professional to contribute to security-related projects and awareness. In fact, the more equipped a workforce is with this knowledge, the less money and time will be lost to security breaches. Based on the analysis of various cyber threats it is found that cyber attackers rely on human error, hackers rely only partly on their security-penetration skills. The other thing they need? People making mistakes. For those who do not work in IT but use computing devices for work, it is necessary to have cyber security training so that they understand how minor mistakes or simple oversights might lead to a disastrous scenario regarding the security or bottom line of their organization. It's a wise step to take on a personal level as well, since even if your mistake was completely unintentional, you won't avoid consequences. No one wants to get fired, especially when you didn't do anything malicious to harm your company, but this is exactly what can happen if you fall victim to an email phishing campaign or other social engineering attack and become the vector by which your company exposes sensitive information. Educate yourself to be suspicious and cautious when it comes to operational security.

10.5.1 Why is Cyber security Important?

Cyber Security

In today's attached world, one and all benefits from advanced cyber defense programs. At an individual level, a cyber-security attack can upshot in everything from identity theft, to extortion attempts, to the loss of important data like family photos. Each person relies on critical infrastructure like power plants, hospitals, and financial service companies. Securing these and other organizations is essential for keeping our society functioning. On the other hand educating the public on the significance of cyber security, and build up open source tools which will make the Internet safer for everyone.

Check Your Progress A:

- 1) What are the various components of the CIA triad?

.....
.....
.....
.....
.....
.....

- 2) Why security knowledge is so important?

.....
.....
.....
.....
.....

- 3) What are the various levels of Cyber Space?

.....
.....
.....
.....
.....
.....

- 4) Fill in the blanks:

1. is all about securing data.
2. Cloud is a technology that allows us to access our files and/or services through the from anywhere in the world.
3. Exploit A malicious application or script that can be used to take advantage of a computer's
4. Cyberspace is a/an domain made up of digital networks that is used to store, modify and communicate information.
5. Internet is a massive of networks.

10.6 IOT AND CYBER WORLD

Cyber security is becoming an important aspect of life and the reason behind this kind of attitude is nothing but the development of technical dependence. Nowadays having a computer that is full of personal information in every house is a common thing. It is one of the most important things that are required to be taken under consideration that with good kind of threats comes a remedy. The remedy in this case is nothing but the development of the cyber security. It is becoming a necessary component of our life because all the data regarding security information, health information, personal information, financial information are stored in the internet. It is a place where the data will stay forever but it is not that secured until security is provided to it. Most of us are always connected to Internet each day via smart phones, laptop, home router, smart TV, high end cars, DVR and camera etc., while being connected to Internet gives us the opportunity to shop online, watch a movie, enjoy music, use maps, search online, pay our bills etc., but with the advent of IoT (Internet of Things) even more gadgets are getting connected like bulbs, thermostat, air conditioners etc. Unfortunately, many of these connected devices will not be designed with security in mind leading to new cyber problems for everyone. Computer security and cyber security are the protection of computer systems from theft or damage to their hardware, software or electronic data, as well as from disruption or misdirection of the services they provide. Below given are the reasons emphasizing cyber security as more important than ever.

1. **The rising cost of breaches:** The fact is that cyber-attacks can be extremely expensive for businesses to endure. Recent statistics have suggested that the average cost of a data breach at a larger firm is very high. But this actually underestimates the real expense of an attack against a company. It is not just the financial damage suffered by the business or the cost of remediation; a data breach can also inflict untold reputational damage. Suffering a cyber-attack can cause customers to lose trust in business and spend their money elsewhere. Additionally, having a reputation for poor security can also lead to a failure to win new contracts.
2. **Increasingly sophisticated hackers:** Almost every business has a website and externally exposed systems that could provide criminals with entry points into internal networks. Hackers have a lot to gain from successful data breaches, and there are countless examples of well-funded and coordinated cyber-attacks against some of the largest companies in the UK. With highly sophisticated attacks now commonplace, businesses need to assume that they will be breached at some point and implement controls that help them to detect and respond to malicious activity before it causes damage and disruption.
3. **Widely available hacking tools:** While well-funded and highly skilled hackers pose a significant risk to your business, the wide availability of hacking tools and programs on the internet also means there is also a growing threat from less skilled individuals. The commercialization of

cybercrime has made it easy for anyone to obtain the resources they need to launch damaging attacks, such as Ransomware and crypto mining.

4. **A proliferation of IoT devices:** More smart devices than ever are connected to the internet. These are known as the Internet of Things, or IoT, devices and are increasingly common in homes and offices. On the surface, these devices can simplify and speed up tasks, as well as offer greater levels of control and accessibility. Their proliferation, however, presents a problem. If not managed properly, each IoT device that is connected to the internet could provide cybercriminals with a way into a business. IT services giant Cisco estimates there will be 27.1 billion connected devices globally by 2021 so this problem will only worsen with time. With the use of IoT devices potentially introducing a wide range of security weaknesses, it is wise to conduct regular vulnerability assessments to help identify and address risks presented by these assets.
5. **Tighter regulations:** It is not just criminal attacks that mean businesses need to be more invested in cyber security than ever before. The introduction of regulations such as the GDPR (General Data Protection Regulation) means that organizations need to take security more seriously than ever or face heavy fines.

The GDPR has been introduced by the EU to force organizations into taking better care of the personal data they hold. Among the requirements of the GDPR is the need for organizations to implement appropriate technical and organizational measures to protect personal data, regularly review controls, plus detect, investigate and report breaches.

10.6.1 Cyber Threats

For a cyber-security expert, the Oxford Dictionary definition of cyber threat is a little lacking it's given as the "the possibility of a malicious attempt to damage or disrupt a computer network or system." This definition is incomplete without including the attempt to access files and infiltrate or steal data. In this definition, the threat is defined as a possibility. However, in the cyber security community, the threat is more closely identified with the actor or adversary attempting to gain access to a system. Or a threat might be identified by the damage being done, what is being stolen or the Tactics, Techniques and Procedures (TTP) being used.

To understand just how technology becomes vulnerable to cybercrime or threat, it helps to first understand the nature of threats and how they exploit technological systems. You might first ask why technology is vulnerable at all, and the answer is simple that is trust. From its inception, the protocols that drive internet, by and large, were not designed for a future that involved exploitation, there was little expectation at its birth that we might need to one day mitigate against attacks such as a distributed denial of service (DDoS), or that a webcam you buy off the shelf might need security protocols to prevent it being hacked and used to spy on you. There is much greater awareness today, but even so you can still buy devices that connect to the internet that have poor security measures or no security at all built-in, because up until recently this simply wasn't part of the design scope. In many cases, the idea

that a device might be used for nefarious purposes isn't even considered. And the result is that today cybercrime almost exclusively leverages the lack of security-focused design in everything from your smart phone and web browser through to your credit card and even the electronic systems in your car. The nature of Cyber threats/Cybercrime comes in a variety of forms ranging from denial of service attacks on websites through to theft, blackmail, extortion, manipulation, and destruction. The tools are many and varied, and can include malware, ransom ware, spyware, social engineering, and even alterations to physical devices (for example, ATM skimmers). It's no surprise then that the sheer scope of possible attacks is vast, a problem compounded by what is known as the attack surface that is the size of the vulnerability presented by hardware and software.

10.6.2 Type of Cyber Threats

In our modern technology-driven age, keeping our personal information private is becoming more difficult. The truth is, highly classified details are becoming more available to public databases, because we are more interconnected than ever. Our data is available for almost anyone to shift through due to this interconnectivity. This creates a negative stigma that the use of technology is dangerous because practically anyone can access one's private information for a price. Technology continues to promise to ease our daily lives; however, there are dangers of using technology. One of the main dangers of using technology is the threat of cybercrimes.

Common internet users may be unaware of cybercrimes, and fall victim of cyber-attacks on a regular basis. Many innocent individuals fall victim to cybercrimes around the world, especially since technology is evolving at a rapid pace. Cybercrimes are any crimes that cause harm to another individual using a computer and a network. Cybercrimes can occur by issues surrounding penetration of privacy and confidentiality. When privacy and confidential information is lost or interrupted by unlawfully individuals, it gives way to high profile crimes such as hacking, cyber terrorism, espionage, financial theft, copyright infringement, spamming, cyber warfare and many more crimes which occur across borders. Cybercrimes can happen to anyone once their information is breach by an unlawful user. Computer security threats are relentlessly inventive. Masters of disguise and manipulation, these threats constantly evolve to find new ways to annoy, steal and harm. We have to equipped with information and resources to safeguard against complex and growing computer security threats and stay safe online. Below mentioned are the few examples of online cyber security threats.

1. **Computer Viruses:** A computer virus is a program written to alter the way a computer operates, without the permission or knowledge of the user. A virus replicates and executes itself, usually doing damage to the computer in the process. It is perhaps the most well-known computer security threat. Carefully evaluating free software downloads from peer-to-peer file sharing sites, and emails from unknown senders are crucial to avoiding viruses. Most web browsers today have security settings which can be ramped up for optimum defense against online threats. But, single

most-effective way offending off viruses is up-to-date antivirus software from a reputable provider.

2. **Spyware Threats:** A serious computer security threat, spyware is any program that monitors your online activities or installs programs without the consent for profit or to capture personal information. While many users won't want to hear it, reading terms and conditions is a good way to build an understanding of how your activity is tracked online. And of course, if a company don't recognize is advertising for a deal that seems too good to be true, be sure that we have an internet security solution in place and click with caution.
3. **Hackers and Predators:** Hackers and predators are programmers who victimize others for their own gain by breaking into computer systems to steal, change, or destroy information as a form of cyber-terrorism. These online predators can compromise credit card information, lock you out of your data, and steal your identity. As we may have guessed, online security tools with identity theft protection are one of the most effective ways to protect yourself from this brand of cybercriminal.
4. **Phishing:** Phishing attacks are some of the most successful methods for cybercriminals looking to pull off a data breach. Masquerading as a trustworthy person or business, phishes attempt to steal sensitive financial or personal information through fraudulent email or instant messages. Antivirus solutions with identity theft protection can be used to recognize phishing threats in fractions of a second.

10.7 CYBER CRIME AND LAW

A commonly accepted definition of cybercrime is a “crime committed using a computer and the internet to steal a person's identity or sell contraband or stalk victims or disrupt operations with malevolent programs”. While there are many different definitions of cybercrime, they all have a few key concepts throughout. These key concepts are criminal activity and the use or abuse of computers. With these concepts in mind cybercrime can be easily defined as using a computer to commit a criminal act.

Cybercrimes create an overwhelming task for law enforcement bureaus since they are extremely technological crimes. Law enforcement organizations must have individuals trained in computer disciplines and computer forensics in order to accurately investigate computer crimes or cybercrimes that have been committed. Additionally, many states must modernize and generate legislation, which disallows cybercrimes and outlines suitable penalties for those crimes. Cybercrimes will likely become more frequent with the arrival of advance technologies. It is important that civilians, law officials, and other associates of the justice system are well-informed about cybercrimes in order to diminish the threat that they cause.

Understanding the threat of cybercrimes is a very pertinent issue because technology holds a great impact on our society as a whole. Cybercrime is growing every day because since technological advancing in computers

makes it very easy for anyone to steal without physically harming anyone because of the lack of knowledge to the general public of how cybercrimes are committed and how they can protect themselves against such threats that cybercrimes poses. There are many ways or means where cybercrimes can occur. Here are a few causes and methods of how cybercrimes can be committed on a daily basis.

1. **Hacking:** In other words, can be referred to as the unauthorized access to any computer systems or network. This method can occur if computer hardware and software has any weaknesses which can be infiltrated if such hardware or software has a lack in patching, security control, configuration or poor password choice.
2. **Theft of information contained in electronic form:** This type of method occur when information stored in computer systems are infiltrated and are altered or physically being seized via hard disks; removable storage media or another virtual medium.
3. **Email bombing:** This is another form of internet misuse where individuals directs amass numbers of mail to the victim or an address in attempt to overflow the mailbox, which may be an individual or a company or even mail servers there by ultimately resulting into crashing. There are two methods of perpetrating an email bomb which include mass mailing and list linking.
4. **Data diddling:** It is the changing of data before or during an intrusion into the computer system. This kind of an occurrence involves moving raw data just before a computer can processes it and then altering it back after the processing is completed.
5. **Salami attacks:** This kind of crime is normally consisting of a number of smaller data security attacks together end resulting in one major attack. This method normally takes place in the financial institutions or for the purpose of committing financial crimes. An important feature of this type of offence is that the alteration is so small that it would normally go unnoticed. This form of cybercrime is very common in banks where employees can steal small amount and it's very difficult to detect or trace an example is the "Ziegler case "wherein a logic bomb penetrated the bank's system, which deducted only 10 cents from every account and deposited it in one particular account which is known as the "penny shaving".
6. **Denial of Service attack:** It is basically where a computer system becomes unavailable to its authorize end user. This form of attack generally relates to computer networks where the computer of the victim is submerged with more requests than it can handle which in turn causing the pc to crash. E.g., Amazon, Yahoo. Another incident occurs in the past whistle blower site wikileaks.org got a DDoS attack.
7. **Virus / worm attacks:** Viruses are programs that can embed themselves to any file. The program then copies itself and spreads to other computers on a network which they affect anything on them, either by

changing or erasing it. However, worms are not like viruses, they do not need the host to attach themselves to but make useful copies of them and do this constantly till they consume up all the available space on a computer's memory. E.g. love bug virus, which affected at least 5 % of the computers around the world.

8. **Logic bombs:** They are basically a set of instructions where can be secretly be execute into a program where if a particular condition is true can be carried out the end result usually ends with harmful effects. This suggests that these programs are produced to do something only when a specific event (known as a trigger event) occurs. E.g. Chernobyl virus.
9. **Trojan attacks:** The term suggests where a program or programs mask themselves as valuable tools but accomplish damaging tasks to the computer. These programs are unlawful which flaccidly gains control over another's system by assuming the role as an authorised program. The most common form of a Trojan is through e-mail. E.g. lady film director in the U.S.
10. **Internet time thefts:** This form is kinds of embezzlements where the fraudulent uses the Internet surfing hours of the victim as their own which can be complete by obtaining access to the login ID and the password, an example is Colonel Bajwa's case- in this incident the Internet hours were used up by a unauthorized person.
11. **Web jacking:** This is where the hacker obtains access and can control web site of another person, where he or she can destroy or alter the information on the site as they see fit to them. This type of method of cybercrime is done for satisfying political agendas or for purely monetary means. An example of such method was MIT (Ministry of Information Technology) was hacked by the Pakistani hackers whereas another was the 'gold fish' case, site was hacked and the information relating to gold fish was altered and the sum of \$ 1 million was demanded.

Cyber terrorism may be defined to be where the deliberate use of disrupting activities, or the risk thereof, via virtual machine, with the purpose to further public, political, spiritual, radical or to threaten any person in continuance of such purposes. Theft crimes include the following:

1. **Credit/Debit Card Fraud:** It is the unlawful use of a credit/debit card to falsely attain money or belongings. Credit/debit card numbers can be stolen from leaky web sites, or can be obtained in an identity theft scheme.
2. **Identity theft:** Identity theft occurs when someone seizes another's individual information without his or her awareness to commit theft or fraudulency. Typically, the victim is led to believe they are revealing sensitive private data to a genuine business, occasionally as a response to an e-mail to modernize billing or membership information etc.

3. **Non-delivery of Goods and Services:** Goods or services that were acquired by individuals online those were never sent.
4. **Phony Escrow Services:** This is where auction participants were persuading by the fraudster where he or she will recommend the use of a third-party escrow service to help the exchange of money and merchandise. The victim is unmindful the impostor has deceived a legitimate escrow service the victim sends payment or products to the phony escrow and obtains nothing in return.
5. **Ponzi/Pyramid method:** This is where investors are lured to capitalize in this falsified arrangement by the promises of irregularly or abnormally high profits but none of the funds are actually made by the so called “investment firm”.

Cybercrimes will always be an ongoing challenge despite the advancements being made by numerous countries. Most countries have their own laws to combat cybercrimes, but some doesn't have any new laws but solely relies on standard terrestrial law to prosecute these crimes.

In response to these absolutely complex and newly emerging legal issues relating to cyberspace, cyber law or the law of Internet came into being. The growth of cyberspace has resulted in the development of a new and highly specialized branch of law called cyber laws i.e. laws of the internet and the World Wide Web. Cyber law is a generic term which refers to all the legal and regulatory aspects of Internet and the World Wide Web. Anything concerned with or related to or emanating from any legal aspects or issues concerning any activity of netizens in and concerning Cyberspace comes within the ambit of Cyber law.

Simply we can say that cybercrime is unlawful acts wherein the computer is either a tool or a target or both, Cybercrimes can involve criminal activities that are traditional in nature, such as theft, fraud, forgery, defamation and mischief, all of which are subject to the Indian Penal Code. The abuse of computers has also given birth to a gamut of new age crimes that are addressed by the Information Technology Act, 2008. Cybercrimes are categorized in two ways:

- **The Computer as a Target:-** using a computer to attack other computers. e.g. Hacking, Virus/Worm attacks, DOS attack etc.
- **The Computer as a weapon:-** using a computer to commit real world crimes. e.g. Cyber Terrorism, IPR violations, Credit card frauds, EFT frauds, Pornography etc.

Cyber Crime is regulated by Cyber Laws or Internet Laws, in India it is addressed by the Information Technology Act, 2008.

Table 10.2: Snapshot of Important Cyber law Provisions in India

Cyber Security

OFFENCE	SECTION UNDER IT ACT
Tampering with Computer source documents	Sec.65 (IT Act)
Hacking with Computer systems, Data alteration	Sec.66 (IT Act)
Publishing obscene information	Sec.67 (IT Act)
Un-authorized access to protected system	Sec.70 (IT Act)
Breach of Confidentiality and Privacy	Sec.72 (IT Act)
Publishing false digital signature certificates	Sec.73 (IT Act)
Sending threatening messages by email	Sec 503 (IPC)
Sending defamatory messages by email	Sec 499 (IPC)
Forgery of electronic records	Sec 463 (IPC)
Bogus websites, cyber frauds	Sec 420 (IPC)
Email spoofing	Sec 463 (IPC)
Web-Jacking	Sec 383 (IPC)
E-Mail Abuse	Sec 500 (IPC)
Online sale of Drugs	NDPS Act
Online sale of Arms	Arms Act

Until sufficient legal actions can be put in place where individual countries and global ways of persecution criminals, self-protection remains the first line of defense. The everyday individuals and businesses need to make sure they are educated on what to do in terms of prevent in becoming the next victim of cybercrimes. This basic awareness can help prevent potential cybercrimes against them. The only possible step is to make people aware of their rights and duties and further making more punishable laws which is more stringent to check them.

10.8 SECURITY BARRIERS

While there are hard costs associated with security incidents in terms of lost data or ransom paid, executive leadership also needs to be prepared for other business impacts such as brand erosion, loss of customer goodwill, shareholder disappointment and earnings volatility, all of which can incur costs months and even years after an initial security incident. Everyone knows that they need to secure their networks and systems, but enterprises which are lacking IT resources, dwindling budgets and the sheer volume of risk to manage; handling security nowadays has become a seemingly insurmountable task. Consequently, more and more businesses are looking towards Managed Security Service Providers (MSSP) for help. Here are three common security challenges companies face and how MSSPs can help solve them.

1. **Specialized talent shortage:** There is a shortage of qualified IT security staff, making it difficult for management to attract and recruit qualified personnel. Escalating salary requirements further complicate the situation. Consequently, many companies skip some of the security

management basics simply because they don't have the time or staff required to implement these practices, making them prime hacking targets. An MSSP (Managed Security Service Provider) can operate in a variety of capacities and fill in whatever security gap a company may have. This includes not only devising a security and compliance strategy for networks and devices but taking over daily security management. By partnering with an MSSP, not only do you have access to a dedicated and specialized workforce, but you also benefit from a team of experts that understands the dynamic security landscape and the latest threats. Just as you would depend on a CPA (Certified Public Accountant) to manage your tax filing because of their knowledge of tax law, an MSSP can provide a level of security expertise that is hard to obtain on your own.

2. **Prioritizing risk:** There's no such thing as perfect protection, rather, it's a matter of appropriately managing risk and making a conscious decision about what to do, and perhaps more importantly, what not to do. For example, while you may be dedicated to building a digital fortress with multiple levels of security, the sheer volume and variety of threats make it difficult to assess your current vulnerabilities and to plan an appropriate course of action. An MSSP can identify your security vulnerabilities and compliance requirements and help you implement a plan that's unique to your organization and business situation. From there, you have two options. Your IT team can execute the security plan or you can leverage the MSSP to manage your day-to-day security needs. For example, at Century Link, we help our customers efficiently manage risk by creating a customized security plan, including threat intelligence, detection and response for a myriad of security concerns.
3. **Managing security expenses:** While buyers are spending more than ever on security-related hardware and software, many companies are still exposed and inadequately prepared for a security incident. Simultaneously, buyers are also under pressure from management to reduce spending and provide more predictable operating expenses. But, there is good news. Effective preventive measures aren't necessarily cost prohibitive. An MSSP can help you spend your security dollars smarter by focusing your spending on the priorities that will have the most impact on your security and compliance posture. With a managed security approach, you transfer the cost of ownership, thereby reducing the need for capital investments. You'll gain a predictable OpEx model that is easier to forecast and budget, especially important when IT budgets are expected to remain flat.

Customers who leverage Managed Security Services are able to move from a reactive stance to a proactive security strategy against a rapidly changing threat landscape. Today's reality is that you need to operate with the assumption that your organization will be breached. However, by partnering with an MSSP, you benefit from "strength in numbers" from an intelligence perspective and increase the likelihood you can stay one step ahead of potential hackers. In this modern age, it seems almost impossible to avoid being a victim of cybercrime, with all the advancements in technology which make it easy for someone to perform cybercrimes.

In light of this, there are some ways however to avoid becoming a victim of cybercrime. Most internet browsers email service, and Internet providers provide a spam-blocking feature to prevent unwanted messages, such as fraudulent emails and phishing emails, from getting to your inbox. However, every user must ensure to turn them on and do not turn them off whatsoever. Also, users must install and keep up-to-date antivirus programs, firewalls and spyware checkers. Along with keeping them up to date, users must make sure that they run the scans regularly. There are many companies out there that provide free software, but there are other you can purchase, along with that of the many produced by the leading companies' providers; in addition, those companies provide free version of their paid or subscription antivirus software. Encryption of information that you do not want anyone to have unauthorized access to is a good way to avoid some cybercrimes; information such as password and credit card information for example. Encryption software runs your data through encryption algorithms to make it unintelligible to anyone who tries to hack into your computer.

Another good precaution is to be weary of who you divulge your personal information to. Try to avoid unknown websites, in particular those that ask for your name, mailing address, bank account number or social security number. When doing online shopping make sure website is secure, look for URLs that starts with "https" and/or have the Trustee or VeriSign seal.



Fig 10.1: Trust & VeriSign Symbol of Secure website

If you do not see these anywhere on the site, you run the risk of submitting credit card information and other personal information to a site that maybe a fraud. Another way to avoid being a victim of cybercrimes is to avoid being susceptible to common frauds, such as inheritance letters, letters asking for your help in placing large sums of money in overseas bank accounts, foreign lotteries, and phony sweepstakes. Those mentioned activities are all methods used by cyber criminals to get your personal information and money. If it sounds too good to be true, it probably is.

Educate children about the proper use of the computer and internet and make sure to monitor their online activities at home and school alike. They should only have access to a computer located in a central area of your home and you should regularly check all browser and email activity. A wise thing is to

use parental control software that limits the type of sites the user can gain access to. In schools, there should be restricted websites and other user restrictions that will help protect the user and entity from cybercrime. Likewise, companies should educate and have written policies governing the workplace pc and its network use to diminish the risk of cybercrime against the company. One definite way to ensure that one don't fall victim of cybercrimes is to disconnect the computer entirely from the internet. If there is no network, then one don't have to worry about any cyber-attacks. However, this option is not the most viable one in our interconnected society. The truth is, it is up to you to take the necessary precautions to avoid potential cybercrimes.

Check Your Progress B:

- 1) What do you understand by Salami Attacks?

.....
.....
.....
.....

- 2) What are cybercrimes? Explain the various categories of cybercrimes.

.....
.....
.....
.....
.....

- 3) Give examples of important cyber law provisions in India.

.....
.....
.....
.....
.....

- 4) What is identity theft?

.....
.....
.....
.....

10.9 LET US SUM UP

In this modern age, it seems almost impossible to avoid being a victim of cybercrime, with all the advancements in technology which make it easy for

someone to perform cybercrimes. In light of this, there are some ways however to avoid becoming a victim of cybercrime. Most internet browsers email service, and Internet providers provide a spam-blocking feature to prevent unwanted messages, such as fraudulent emails and phishing emails, from getting to your inbox. However, every user must ensure to turn them on and do not turn them off whatsoever. Also, users must install and keep up-to-date antivirus programs, firewalls and spyware checkers. Along with keeping them up to date, users must make sure that they run the scans regularly. There are many companies out there that provide free software, but there are other you can purchase, along with that of the many produced by the leading companies' providers; in addition, those companies provide free version of their paid or subscription antivirus software. Encryption of information that you do not want anyone to have unauthorized access to is a good way to avoid some cybercrimes; information such as password and credit card information for example. Encryption software runs the data through encryption algorithms to make it unintelligible to anyone who tries to hack into the computer.

Another good precaution is to be weary of who divulge the personal information to. Try to avoid unknown websites, in particular those that ask for the name, mailing address, bank account number or social security number. When doing online shopping make sure website is secure, look for URLs that starts with "https" and/or have the Trustee or VeriSign seal. If one do not see these anywhere on the site, there run the risk of submitting credit card information and other personal information to a site that maybe a fraud.

Another way to avoid being a victim of cybercrimes is to avoid being susceptible to common frauds, such as inferences letter, letter asking for help in placing large sums of money in overseas bank accounts, foreign lotteries, and phony sweepstakes. Those mentioned activities are all methods used by cyber criminals to get personal information and money. If it sounds too good to be true, it probably is.

Educate children about the proper use of the computer and internet and make sure to monitor their online activities at home and school alike. They should only have access to a computer located in a central area of your home and you should regularly check all browser and email activity. A wise thing to is to use parental control software that limits the type of sites the user can gain access to. In schools, there should be restricted websites and other user restrictions that will help protect the user and entity from cybercrime. Likewise, companies should educate and have written policies governing the workplace pc and its network use to diminish the risk of cybercrime against the company. One definite way to ensure that you don't fall victim of cybercrimes is to disconnect the computer entirely from the internet. If there is no network, then one don't have to worry about any cyber-attacks. However, this option is not the most viable one in our interconnected society. The truth is, it is up to you to take the necessary precautions to avoid potential cybercrimes.

10.10 KEY WORDS

Cyber Laws: Cyber law is a generic term which refers to all the legal and regulatory aspects of Internet and the World Wide Web. Anything concerned with or related to or emanating from any legal aspects or issues concerning any activity of netizens in and concerning Cyberspace comes within the ambit of Cyber law.

Cyber Security: Cyber security is the protection of computer systems from theft or damage to their hardware, software or electronic data, as well as from disruption or misdirection of the services they provide. The main aim of cyber security is to help make the business more successful.

Cyber Space: Cyberspace is an interactive domain made up of digital networks that is used to store, modify and communicate information. It includes the internet, but also the other information systems that support our companies, infrastructure and services.

Cybercrime: Cybercrimes are the crimes committed using a computer and the internet to steal a person's identity or sell contraband or stalk victims or disrupt operations with malevolent programs. Cybercrimes create an overwhelming task for law enforcement bureaus since they are extremely technological crimes

Hacking: Hacking is the unauthorized access to any computer systems or network. This method can occur if computer hardware and software has any weaknesses which can be infiltrated if such hardware or software has a lack in patching, security control, configuration or poor password choice.

Identity Theft: Identity theft occurs when someone seizes another's individual information without his or her awareness to commit theft or fraudulence. Typically, the victim is led to believe they are revealing sensitive private data to a genuine business, occasionally as a response to an e-mail to modernize billing or membership information etc.

Information Security: Information security also known as InfoSec is all about protecting the information, which generally focuses on the confidentiality, integrity, availability (CIA) of the information. It ensures that both physical and digital data is protected from unauthorized access, use, disclosure, disruption, modification, inspection, recording or destruction.

Logic Bombs: They are basically a set of instructions where can be secretly be execute into a program where if a particular condition is true can be carried out the end result usually ends with harmful effects.

Virus / Worm Attacks: Viruses are programs that can embed themselves to any file. The program then copies itself and spreads to other computers on a network which they affect anything on them, either by changing or erasing it.

Web Jacking: This is where the hacker obtains access and can control web site of another person, where he or she can destroy or alter the information on

the site as they see fit to them. This type of method of cybercrime is done for satisfying political agendas or for purely monetary means.

Cyber Security

10.11 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A:

Q- 4

- 1) Data security 2) Internet 3) Vulnerability 4) Interactive
- 5) Network

10.12 TERMINAL QUESTIONS

- 1) State the differences between Internet and WWW.
- 2) State the differences between Information Security and Cyber Security.
- 3) What is Cyber Security? State its importance in the today's digitally connected world.
- 4) What do you understand by Cyber Threats? Explain its various types.
- 5) What are the various forms of Cybercrimes?
- 6) What are the various Security Barriers faced by the companies? How MSSPs can help solve them?
- 7) What are the various types of Theft Crimes?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 11 CYBER SECURITY MEASURES

Structure

- 11.1 Introduction
- 11.2 Cyber Security Measures
 - 11.2.1 Role of cyber security analysts
 - 11.2.2 Essential cyber security measures
 - 11.2.3 Precautionary cyber-security measures enterprise takes
- 11.3 IoT and its Impact
- 11.4 Vulnerable Information on Internet
 - 11.4.1 Vulnerabilities of Systems
 - 11.4.2 Internet Vulnerabilities
 - 11.4.3 Wireless Security Challenges
 - 11.4.4 Malicious Software
 - 11.4.5 Hackers and Computer Crime
 - 11.4.6 Cyber Crime
 - 11.4.7 Global Threats: Cyber terrorism and Cyber Warfare
- 11.5 Cyber Forensic
- 11.6 Securing the Business on Internet
- 11.7 Securing Network Transaction
- 11.8 Security Measures and Enforcement
 - 11.8.1 Biometric Security Measures
 - 11.8.2 Non-biometric Security Measures
 - 11.8.3 Cyber Physical Security System
 - 11.8.4 Access Control
 - 11.8.5 Ensuring Software Quality
- 11.9 Let Us Sum Up
- 11.10 Keywords
- 11.11 Terminal Questions

11.0 OBJECTIVES

After studying this unit, you should be able to:

- understand various cyber security measures;
- explain about vulnerable information on Internet;
- explain cyber forensic methods;
- understand various kinds of threats over Internet;
- understand how to secure business transactions over Internet; and
- explain about various types of security measures and enforcement.

11.1 INTRODUCTION

The whole world is facing the problem of how to fight cybercrime and how to effectively promote security to the citizens and organizations. If we go into a backdrop, we will quickly understand that Cybercrime, also called computer crime are basically the use of a computer as an appliance to further illegal ends, such as committing fraud, trafficking in child pornography and intellectual property, stealing identities, or violating privacy etc.

To deal with these emerging crimes a coordinated global response to the problem is required. Cybercrime is growing in a big way and current technical models to deal with cyber offense are disorganized in stemming the boost in cybercrime. This serves to indicate that further preventive strategies are required in order to reduce cybercrime. This, unit throws a light on various aspects related to cybercrimes in its further sections and various security measures one can take to come out from the havoc as whole world is now moving from brick-&-mortar system to Click-&-mortar system.

11.2 CYBER SECURITY MEASURES

As we know that the Internet has changed business, education, government, healthcare, and even the ways in which we interact with our loved ones—it has become one of the key drivers of social evolution. It is one of the main reasons that malicious links, trojans and viruses are entering through internet. The data, breaches are becoming more frequent, and unsuspecting users are more dependent than ever in advance. When one click can cost thousands, and even millions, users need actionable to do's that can facilitate them to stay attentive and safe online. Cybercrimes, unlike traditional crimes which are committed in one geographic location, are committed online and it is often not clearly linked to any geographic location which means it is not jurisdiction centric. Computer security, cyber security or information technology security is the practice of defending computers, servers, mobile devices, electronic systems, networks, and data from malicious attacks.

11.2.1 Role of Cyber Security Analysts

The everyday work of an information security or cyber security analyst will fluctuate, based on where they work, but in general, cyber security analysts' jobs lead to: Monitoring security access. Security analysts will assess passwords, badges, log-ins, and more as they work to keep a site or system safe. Cyber security analysts (also called information security analysts) map and carry out security measures to take care of a company's computer networks and systems. They keep continuous tabs on threats and supervise their organization's networks for any breaches in security. On the other hands the responsibilities is much wider some the major roles of security analyst are:

- Set and implement user access controls and distinctiveness and access management systems.
- Monitor network and application performance to categorize and lopsided activity.

- Carry out regular audits to ensure security practices are compliant.

11.2.2 Essential Cyber Security Measures

Various essential cyber security measures are provided below:

- Use strong passwords
- Strong passwords are vital to good online security
- Control access
- Put up a firewall
- Use security software
- Update programs and systems regularly
- Monitor for intrusion
- Raise awareness

In further sections the unit has discussed various robust cyber security measures in detail.

11.2.3 Precautionary Cyber-Security Measures Enterprise Takes

As we know that every business is moving online. To achieve the cyber-security basics certain things, need to be taken care as discussed below:

- **A Unified Threat Management (UTM) System:** There must be a combination of security appliances which acts as the gateway to the internet.
- **A Spam Filter:** A spam filter is a program that is used to detect unsolicited and unwanted email and prevent those messages from getting to a user's inbox. Like other types of filtering programs, a spam filter looks for definite criterion on which it bases judgments. On the other hands it stops potentially malicious files from entering The network via email.
- **Antivirus/anti-malware software:** Antivirus software was originally developed to detect and remove computer viruses, hence the name. Antivirus software, or anti-virus software (abbreviated to AV software), also known as anti-malware, is a computer program used to prevent, detect, and remove malware. These are applications which protect servers, laptops and other devices from malware.
- **Patch Management System:** It manages the installation of software updates to close security holes.
- **2-Factor Authentication:** This gives a second level of authentication, preventing unauthorized sign-ins.
- **Device Encryption:** This makes any data stored on the machine useless to criminals and keeps data secret.
- **Routine Data Backup:** This should keep a copy of business data at a secure off-site location in case the original is lost.
- **Content Filtering:** This prevents access to hazardous or prohibited websites which reduces the risk of infection.
- **Disaster Recovery Plan:** This sets out how one will recover from a spontaneous occurrence such as fire or cyber-attack.

11.3 IOT AND ITS IMPACT

IoT is an acronym used for Internet of Things; it is basically a network of several devices which are attached with miscellaneous software, electronics, and network connectivity of distinct orientations, aimed at exchanging and compiling of any kind of information. The amount of data that IoT devices can create is very gigantic. The vast diffusion of connected devices in the IoT has created enormous demand for robust security in response to the growing demand of millions or perhaps billions of connected devices and services worldwide.

Since the devices which are using IoT technology are supposed to be connected through Internet all the time, it puts up the questions on security themselves, their platforms and operating systems, their communications and the systems to which they are connected. To overcome such security challenges, a new set of tools will be required to protect these devices and platforms from both information attacks and physical tempering. Also, there is a need to encrypt the transactions between the devices. Also, there will be an issue of compatibility too because there are many devices with very simple processors and operating systems and are unable to support sophisticated security systems.

We know and depicts from the above paragraph that IoT security is the technology area apprehensive with safeguarding connected devices and networks in the internet of things (IoT). Allowing devices to connect to the internet opens them up to a number of serious vulnerabilities if they are not appropriately protected. IoT security is the act of securing Internet of Things devices and the networks they are connected to. In the business setting, IoT devices include industrial machines, smart energy grids, building automation, plus whatever personal IoT devices employees bring to work.

- Blocking a program behind a firewall or restricting usage to only certain features of the software, saving critical data from leaking. All the devices connected to the network should be updated to the latest software.
- Hardware, software and connectivity will all need to be secure for IoT objects to work effectively. Without security, any connected object, from refrigerators to manufacturing bots, can be hacked. Once hackers gain organizes, they can take over the object's functionality and steal the user's digital data.

11.4 VULNERABLE INFORMATION ON INTERNET

Vulnerability is the inability to defend against a hazard or to act in response when a disaster has crop up. For instance, people who keep going on plains are more vulnerable to floods than people who live higher up. This is what we call economic vulnerability. If we talk in a technological perspective, A computer vulnerability is a cyber-security expression that refers to a

deficiency in a system that can leave it open to attack. This vulnerability could also refer to any type of weakness occur in a computer itself, in a set of procedures, or in anything that allows information security to be exposed to a threat.



Fig 11.1: Various vulnerable terms in cyber world

Now, almost every business has a data driven processes. If a machine or a computer starts running business transactions, the business person might not be proficient to sell to the customers or place orders with the suppliers when the machine is not in order. It may also take place sometimes that a trespasser tries to penetrate the computer system and steals or destroys business data, confidential payment details of the customers. In such a scenario, any business might never be able to operate. Accordingly, for success of any business, data security should be on a top precedence. There should be policies, procedures, and technical measures in the business organizations to prevent unauthorized access, alteration, theft, or any kind of physical damage to information systems.

11.4.1 Vulnerabilities of Systems

When a large volume of digital information is stored, it is vulnerable to many other types of threats. Information systems can be interconnected at multiple locations through computer networks. And hence, the intruder's attack or an unauthorized access can anytime happen at any access point in the computer network, which can destroy the whole network.

In the same manner, the multi-tier client/ server computing environment is also vulnerable at each layer. It is always possible for an unauthorized person to steal or alter valuable data of the organization over networks, during data transmission. Intruders may also use denial of-service attacks or malicious software to interrupt the operations.

11.4.2 Internet Vulnerabilities

Instead of computer networks, the systems connected through Internet, are more vulnerable because they are open to anyone in the whole world. The Internet is so big that it can have an incredibly widespread effect when abuses happen. When the Internet is used in our corporate network, we are much more vulnerable to external operations in the information networks of the enterprise. Computer systems that are permanently linked to the internet are more vulnerable to outside persons' penetration because they can quickly register with fixed IP addresses.

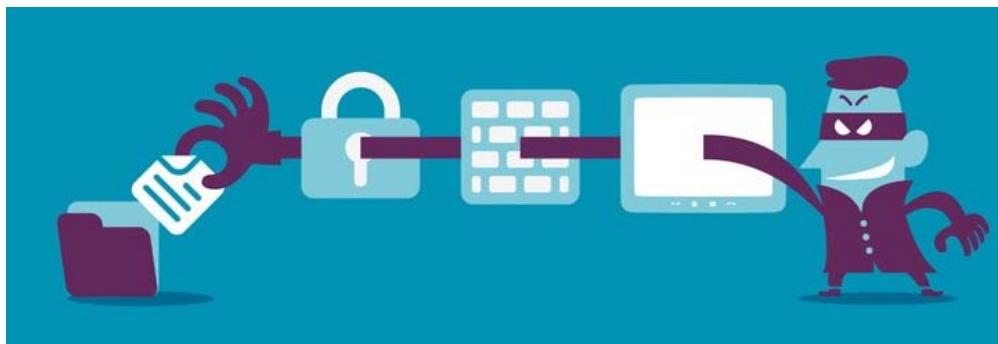


Fig-11.2 (a): Vulnerability though Internet



Fig-11.2 (b): Fixing Vulnerability though Internet

A fixed IP address provides hackers with a fixed target. If the telephone service is not connected to a secure personal internet network, the internet infrastructure that is switched is most vulnerable. The majority of public Internet Voice over IP (VoIP) traffic is not encrypted so that anyone who has a network can hear a debate. Conversations can be stopped by hackers, or voice services shut down, by flooding VoIP supportive servers. The vulnerability of the mail, instant messaging (IM) and peer to peer file-sharing services was also increased. It is possible for workers to use emails for transmitting valuable company secrets, financial data or sensitive information to unauthorized recipients, as malicious software springs boards or unauthorized access to corporate systems internally. Popular IM applications do not use a secure word layer to allow external users to intercept and read it when transmitting the public Internet. In certain cases, instant messaging via the Internet may be used as the back door to a secure network. Sharing in peer-to-peer files (P2P) may also spread malicious software or expose personal or corporate information.

11.4.3 Wireless Security Challenges

Wireless networking provides many advantages, but it is also coupled with various security threats. Implementation of technological solutions to wireless security threats and vulnerabilities, wireless security is a primary necessity of an organization. It is not safe to use a wireless network at public place like, an airport, library, shopping mall etc. In fact, the wireless network at home is not safe because anytime the radio frequency bands can be scanned easily. Hence, LANs, Bluetooth, Wi-Fi networks etc. all are vulnerable to hacking easily. The wireless networks have four basic components:

- The transmission of data using radio frequencies
- Access points that provide a connection to the organizational network
- Devices e.g. - laptops, PDAs, etc.
- Users.

These components may become the source for attack due to which the organisation has to compromise the data. Furthermore, in a Wi-Fi network, intruders can easily collect the identity Service Set Identifiers (SSIDs), which mark access points, transmit a number of times and thus. Wi-Fi networks usually do not have fundamental safeguards, which allow unauthorized users to access the network in the surrounding buildings or outside the site. An attacker that has an access point with the correct SSID may access other network resources. Also, intruders can use the information they gather to set up unauthorized access points for the radio Network Interface Controller (NIC) of a user in a different radio channel near the website. Hackers using the rogue access point will collect unsuspecting users' login credentials once this association is formed.

11.4.4 Malicious Software

These are also known as malware which include a number of threats, eg- computer viruses, worms, and Trojan horses.

- **Computer virus:** A computer virus is a software program that attaches itself to other software programs or data files in order to be executed. It does not seek any permission of the user before execution of the program.



Fig 11.3: Computer Virus

Virus may be highly destructive which may destroy data of the organization completely, block computer memory, reformat a computer's hard drive or cause the programs to run improperly. Viruses may spread from machine to machine, for example, through an e-mail attachment or an infected file.

- **Worms:** Worms are independent computer programs which use a computer network to copy themselves from one computer to other computers. These can operate on their own without any human intervention and there is no need to attach it to any computer program files.

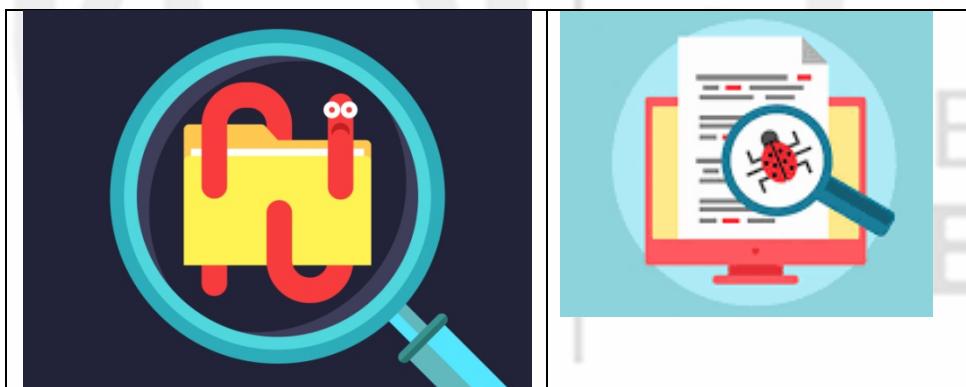


Fig 11.4: Computer Worms

Worms spread much more promptly than computer viruses. Worms are very harmful for data and programs. These may choke the whole computer network.

- **Trojan horse:** Another malware is Trojan Horse which attacks on the data silently. The Trojan horse is not a virus itself, but it gives a path to viruses to enter into the systems. For example, ZeuS (Zot) Trojan which infected more than 3.6 million computers in past years and still poses a threat. This software helped the unauthorized person to steal the bank login credentials of the customers secretly by catching their passcode keystrokes as they used in their computers. Zeus is spread through phishing.

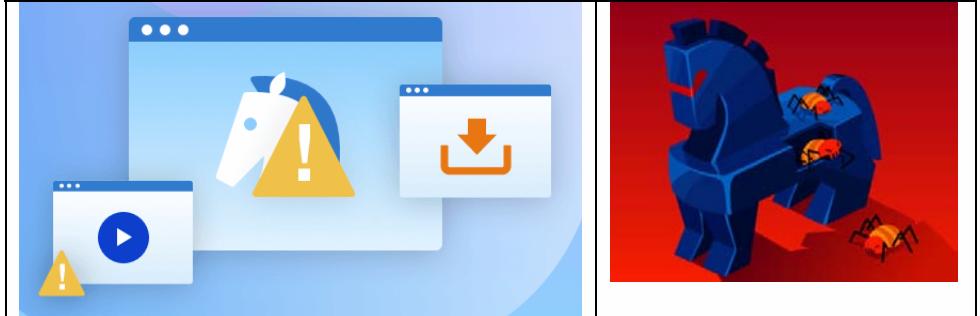


Fig 11.5: Trojan Horse

- **SQL injection attacks:** SQL injection attacks take benefit of weak points of web application software which are not robust in terms of security check or which do not have sufficient code written into them for data security. Such attacks introduce malicious programs into system and networks of the organisations.

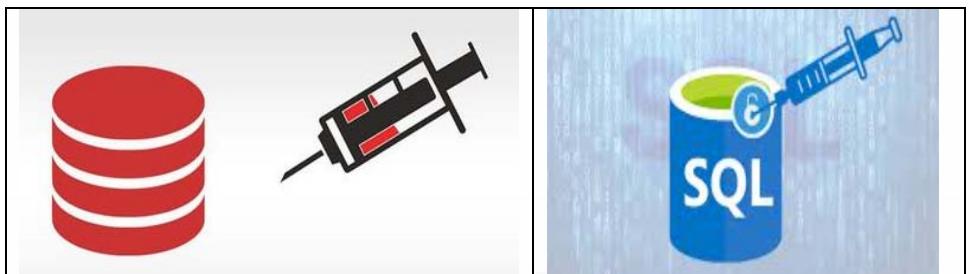


Fig 11.6: SQL Injection

- **Ransomware:** There is a malware known as ransomware which blocks access to files and displays lots of pop-up messages and extracts money from users by taking control of their systems. For example, the ransomware ware called 'WannaCry' that attacked computers in more than 150 countries in the past years. It encrypted the files of the system and then asked users to pay lots of money to recover access. Ransomware may enter to your system by downloading unauthorized email's attachments, or downloading a file from an unsafe link. Few malwares are spywares. Spywares install themselves secretly systems to watch activities of the users. Multiple types of spyware exist which try to breach the privacy of the users.



Fig 11.7: Ransomware

- **Keyloggers:** Another one is Keylogger which records every keystroke made on a computer or mobile phone to steal serial numbers or another codes of software for attacking on the data of the

user, to gain access to email accounts or passwords or to fetch credit/debit card details or other financial data. Few spywares reset web browser home pages, redirect search requests or slow performance by taking up too much computer resources.

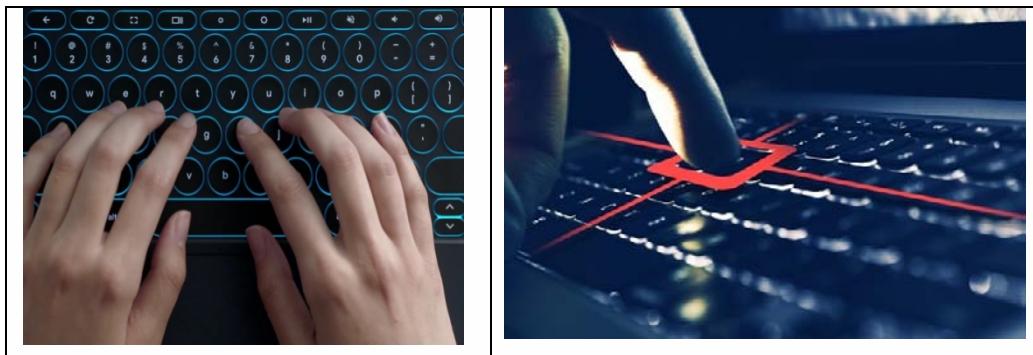


Fig 11.8: Keylogger

11.4.5 Hackers and Computer Crime

A hacker is an intelligent coder whose aim is to achieve access to a computer system of another user. They can request malicious files without any human intervention, destroy useful data, transmit data, and install a hidden program running in the background to monitor user actions. They are experts and know methods of gaining unauthorized access by finding weaknesses in the security protections employed by Web sites and computer systems. The purpose of hacking a system is to steal data or secrete information, to damage system, defacement, destruction of a Web site or corporate information system etc. The mobile platform that most hackers use is Android, world's leading mobile operating systems. Viruses on mobile devices pose grave threats to company computing as many cellular devices are now related to corporate information systems. Social networking sites such as Facebook, Blog sites etc. have also become the source of malware or spyware. Members are more likely to trust messages they receive from friends, even if this communication is not authentic. Various types of computer crimes by hackers are discussed below:

- **Spoofing and Sniffing:** In order to gain access to sensitive information of the users, hackers generally pretend to be someone known to the users. This is called spoofing. Sometime, hacker also shares a web link with the users which are entirely different from the original website, to befool the users. In this manner, the hacker may collect and process orders, effectively stealing business as well as sensitive customer information from the original site.

Sniffing is the mechanism by which data packets move through a network of computers via sniffers can be monitored and captured. Network administrators use Packet Sniffers for monitoring data traffic through their network. These are called analyzers of network protocols. Sniffers can identify possible network vulnerabilities or illegal activities on networks, but can be dangerous and very difficult to detect if used negatively. Sniffers allow the hackers, including emails, company files

and confidential reports, to steal sensitive information from any part of the network.

- **Denial-of-Service Attacks:** When a hacker does such an activity due to which the server of an organization starts receiving huge requests for some service, the server stops responding to the genuine requests also due to congestion or crash of the network. This is called distributed denial-of-service (DDoS) attack. Although DoS attacks do not destroy information or access restricted areas of a company's information systems, they often cause a Web site to shut down, making it impossible for genuine users to access the site. These attacks are very dangerous for e-commerce sites as these make the site shut down because it is inaccessible to customers.

DDoS attacks also use tens of thousands of "zombie" PCs, which have not become a botnet, infected with malicious software. These botnets are created by hackers who infect other people's computers with bot malware that opens a back door to send orders from an intruder. A slave or zombie is transformed into the infected machine that serves a master computer from another human. Hackers may use the botnet's accumulated resources to conduct attacks on DDoS, phishing campaigns or unselected "spam" e-mail until they infect enough computers

11.4.6 Cyber Crime

Any criminal activity or data theft which is done by using Internet is called cybercrime. Various types of cyber crimes are explained in detail below:

- **Identity Theft:** As more and more people have started using Internet and doing online transactions, the problem of identity theft is increasing day by day. It is one of the cyber crimes in which personal or financial information is acquired by some unauthorized person over internet to harm the user. The information may be used to steal money from the bank of the account holder or to purchase lots of things, merchandise, or services by using credit card in the name of the victim or to provide the thief with false credentials.

Identify fraud on the internet that has been a big goal of website hackers with credit card files. Often, different types of e-commerce sites are one of the origins of a crime in which cyber criminals collect personal information from their users in order to render consumer fraud.

- **Phishing:** One increasingly popular tactic for identity theft is called Phishing which involves setting up fake Web sites that looks like those of real websites to ask users for their personal or financial data. Sometimes e mails are also sent to the victims along with links of fake websites which resembles the home page of their bank's website. In a more targeted form of phishing called spear phishing, which befools the users through text messages or social media messages and appear to come from a trusted source.

Phishing can be classified in two ways, known as evil twins and pharming which are even more difficult to identify.

- i. **Evil twins:** These are wireless networks that pretend to offer trustworthy Wi-Fi connections to the Internet, such as those in airports, hotels or shopping malls. The fake network looks same to an authentic public network. Passwords or credit card numbers of innocent users are captured by cyber criminals as soon as they log on to the network.
 - ii. **Pharming:** Pharming redirects users to a fake web page, even after typing the right URL of the website. This is also known as “The phishing without a lure”. The cybercrime of phishing attracts many penal provisions of the Information Technology Act, 2000.
- **Pay-Per-Click Fraud:** For all kinds of sponsored search results displayed by a search engine, the advertiser pays fee for each click it receives, with a result of increased potential buyers to the products. Click fraud occurs when an individual or computer program deceitfully clicks on an online ad without any intention of learning more about the products displayed in the ad to purchase it. Click fraud has become a serious problem at Google and other Web sites that feature pay-per-click online advertising. Because of the competition between companies, few companies employ third parties to click on advertising from the competitor to exacerbate their performance by - marketing expenditure. This fraud can also be done with clicking software programmes, for which botnets commonly are used. Search engines like Google are attempting to track this fraud but are reluctant to publicize their efforts.

11.4.7 Global Threats: Cyber Terrorism and Cyber warfare

All the cybercrimes that have been discussed so far are borderless as the medium of travel is Internet. It can travel everywhere in every country and harm anywhere in the world. China, the United States, South Korea, Russia, and Taiwan are currently the sources of most of the world's malware. In fact, countries are trying to damage the economies of their competitors, spying them by using such cyber activities. The “Cyber warfare” is a state-sponsored activity aimed at smashing, defying and inflicting harm and destruction on a state or nation through intrusion on their computers or networks.

Generally speaking, cyber warfare attacks are becoming more common, sophisticated and potentially destructive. In the course of years, hackers have robbed plans for missile tracking systems, satellite navigation equipment, defense drones and advanced jet fighters. Since their key financial, health, government and industrial institutions depend on Internet to conduct their day-to-day operations, cyber warfare poses a severe threat to modern society infrastructure. It also includes defending cyber warfare against such attacks. The Interactive Organization Session explains some recent cyber war attacks and their increasing sophistication and gravity.

11.5 CYBER FORENSIC

Cyber forensic is a branch of digital science in computers and digital storage media which has facts. In order to respond to legal action, data protection and control management have become extremely essential. Today, a lot of the evidence is available in digital form for inventory fraud, misappropriation, theft of business secret data, cybercrime and several civil cases. In addition to facts from printed and type-written pages, legal cases today depend on evidence portrayed as digital data stored on mobile storage devices, CDs and hard disc machines, and on Internet email, instant messages, and e-commerce. The most popular form of electronic proof nowadays is e-mail.

In a legal action, a firm has to respond to a discovery request for access to information that may be used as evidence, and the company is required by law to produce the required data. The cost of responding to a discovery request can be huge if the company has trouble displaying the required data or the data have been corrupted or destroyed. Courts now impose severe financial and even criminal penalties for improper destruction of electronic documents.

A special policy for the preservation of electronic documentation ensures that files, e-mails and other records are organised well, accessible and neither too long nor too soon is kept. It also represents an understanding of how digital forensics can be maintained. In computer forensics, the scientific data processing, study, authentication, preservation and analysis is used in a way that the information is used as evidence in court of law and that is preserved or recovered from computer storage media. The following issues are addressed:

- Recover computer data while ensuring the credibility of proof
- Secure electronic data storage and handling
- Finding vast volumes of electronic data for essential details
- Submitting to a court of law the details

Electronic proof can be found in the form of data on computer storage media not apparent to the regular person. An example is a file that has been deleted on the PC hard drive. Data can be removed by a user on computer storage media by different techniques. Software forensic experts attempt to retrieve confidential data to show. Software forensics awareness should be integrated into the contingency planning phase of a business. The CIO, security professionals, information technology personnel and corporate counsel must work together to implement a strategy which, if legal requirements occur, can be enforced.

Check Your Progress A:

- 1) Distinguish between spoofing and sniffing.

.....
.....
.....
.....
.....

- 2) What are the various global threats of cyber terrorism?

.....
.....
.....
.....
.....

- 3) How does pay-per-click fraud occur?

.....
.....
.....
.....
.....

- 4) How do hackers execute computer crimes?

.....
.....
.....
.....
.....

11.6 SECURING THE BUSINESS ON INTERNET

With the constant stream of new technologies, companies are rapidly changing their IT environments to keep a step ahead of their competitors. However, implementing the e-business applications may be impossible without a coherent, consistent approach to e-business security. Failure to protect information assets from external and internal intruders can lead to embarrassing public exposure, loss of customer confidence and financial loss. A company's decision to protect itself is not just a technology decision. It is a business decision.

Ensuring the security of corporate assets is a continuous and dynamic process, rather than an item on a checklist that can be forgotten once it is set up. The solutions' openness and extensibility give to a global communications company the flexibility to leverage existing technologies and adopt new ones as its e-businesses evolve.

- **Technologies and Tools for Protecting Information Resources:** Companies have a variety of information resources security technologies. These include instruments to manage user identities, prevent unauthorized access to systems and data, ensure the available framework and guarantee the quality of software.
- **Identity Management and Authentication:** Medium-sized and large businesses have several separate IT infrastructures and processes, each with own user community. Identity software automates the process of monitoring the device rights of all these users, granting each user a unique digital identity to access each system. It also provides tools for user authentication, user identity security and device access control.

To gain access to a system, authentication is must for a user. Authentication means the ability to know that the right person is accessing which is established by using username and password known only to the authorized user. But user passwords are also lacking, they are shared and weak passwords are chosen. Excessively difficult login schemes hinder employee efficiency. Users typically prefer easy passwords that enable complex passwords to be transferred, and few users also write or hold their passwords near their workstations easily available. Social engineering tricks sent over a network can also rob passwords.

Any of these issues are solved by modern authentication methods such as keys, intelligent cards and biometric authentication. A token is a physical instrument, similar to an ID card designed to prove a single user's identity. Tokens are tiny devices that generally fit on key rings and often change pass codes.

11.7 SECURING NETWORK TRANSACTION

Various ways of securing networks transactions are discussed below:

- **Securing wireless networks:** The Wired Equivalent Privacy (WEP), initial security standard developed for Wi-Fi, is not very successful, because the encryption key is comparatively easy to crack. However, if users remember to allow it, WEP provides some margin of protection. The use of Virtual Private Network (VPN) technology in access to internal corporate data will further enhance Wi-Fi security. It also operates an encrypted authentication scheme with a central authentication server to ensure that the network is accessed only with the approved users.
- **Encryption and public key infrastructure:** Encryption is one of the most common methods to protect digital information stored or shared by

the organizations over the Internet. It is the process of transforming plain text or data into encrypted data, called cipher text so that an unauthorized person cannot read it. It can be read only by receiver and sender. A secret numerical code, called an encryption key is used to transforms plain data into cipher text. The message must be decrypted by the receiver. The receiver is supposed to decrypt the data by using another key or the same key. There various methods for encrypting network traffic on the Web as discussed:

- **Secure Sockets Layer (SSL):** SSL is a protocol used for encrypting data flowing over the Internet. Along with Transport Layer Security (TLS) enable client and server computers to manage encryption and decryption activities as they communicate with each other during a secure Web session. SSL and TLS are designed to establish a secure connection between two computers.
- **Secure Hypertext Transfer Protocol (S-HTTP):** It is another protocol used for encrypting data flowing over the Internet, but it is limited to individual messages. Internet client browser software and servers generate the secure session. The client and the server discuss what key and what level of security is required to use. Once a secure session is established between the client and the server, all messages in that session are encrypted.
- **Symmetric key encryption:** In symmetric key encryption, the sender and receiver create a secure Internet session by creating a single encryption key and sending it to the receiver, as a result, both the sender and receiver share the same key. The strength of the encryption key is measured by its bit length. Today, a typical key will be 128 bits long (a string of 128 binary digits).There is a drawback with symmetric encryption key that the key itself must be shared among the senders and receivers, which exposes the key to outsiders who might just be able to capture and decrypt the key.
- **Public key encryption:** This is more secure form of encryption which uses two keys-
 - Public-owned by sender, encrypts the messages
 - Private-owned by the receiver, decrypts the messages

To send and receive messages, communicators first create separate pairs of private and public keys. The public key is kept in a directory and the private key must be kept secret. The sender encrypts a message with the recipient's public key. On receiving the message, the recipient uses his or her private key to decrypt it.

- **Digital certificates:** These are data files for identifying online transaction users and electronic properties. A digital system of certificates uses a trustworthy third party called a Certificate Authority (CA) to verify the identity of a user. Many CAs, including Symantec, GoDaddy and Comodo, are available in the USA and worldwide. When Certifying Authority verifies a digital certificate of the user offline, a

digital encrypted certificate containing owner identity information and a copy of the public key of the owner is produced from the CA server.

The certificate ensures that the appointed owner has the public key. The CA provides its own public key on the web in print. The receiver of an encrypted message uses the public key of the CA to decipher and validate the digital certificate attached to the message and then obtain public key information and identity details found in the certificate. The recipient may submit an encrypted response by using this information. A credit card consumer and a merchant may verify their digital certificates by using digital signatures before exchanging data from an accepted and trusted individual. In electronic commerce, Public Key Infrastructure (PKI) is now commonly used in use of public key cryptography that operates with a CA.

- **Securing transaction with Blockchain:** It is an alternative approach for securing transactions and establishing trust among multiple parties. A Blockchain is a chain of multiple blocks that contain records of transactions. Each block is connected to all the blocks before and after it and block chains are continually updated and kept in sync. This makes it difficult to tamper with a single record because one would have to change the block containing that record as well as those linked to it to avoid detection.

Once recorded, a Blockchain transaction cannot be changed. The records in Blockchain are secured through cryptography and all transactions are encrypted. Blockchain network participants have their own private keys that are assigned to the transactions they create and act as a personal digital signature. If a record is altered, the signature becomes invalid and the Blockchain network will know immediately that something is inappropriate. Because block chains are not kept at a central location, they don't have a single point of failure and cannot be changed from a single computer. Blockchain is suitable for environments with high security requirements and mutually unknown actors.

- **Fault-tolerant computer systems:** Fault – tolerant computer system have redundant hardware, software, and power supply components that create an environment that provides continuous, uninterrupted service. Fault-tolerant computers use special software routines or self-checking logic built into their circuitry to detect hardware failures and automatically switch to a backup device. These are special systems such that different parts from these computers can be removed and repaired without any disturbance to the computer system.
- **High-availability computing environments:** High availability computing environments are generally used for e-commerce applications which have very less requirement for heavy e-commerce processing where the organisations depend on digital networks for their internal operations. There is a need of backup servers, distribution of processing across multiple servers, high-capacity storage, and good disaster recovery and business continuity plans for a good execution of High-

availability computing. Also, it needs extremely robust computing platforms with scalable processing power, storage, and bandwidth to function properly. Both fault tolerance and high-availability computing are used to minimize downtime. Downtime is the period of time in which a system is not able to perform. Comparatively, high-availability computing helps firms recover quickly from a system crash than fault tolerance systems.

- **Deep Packet Inspection (DPI):** It can sometimes be noticed that the university network on the campus is very sluggish. This may happen if anyone uses the network to download music or see YouTube, or another hard-to-download video, as the bandwidth of the application is heavily used and the campus network has slowed down, slowing down the download speed on other users' devices. Deep packet inspection (DPI) technology solved this problem. DPI examines data files and sorts out low-priority online material while assigning higher priority to business-critical files. Based on the priorities established by a network's operators, it decides whether a specific data packet can continue to its destination or should be blocked or delayed while more important traffic proceeds.
 - **Security outsourcing:** There are various organisations which are unable to acquire the security measures and resources to provide a secure high-availability computing environment to their workforce. Generally, it happens with mid-level or small-scale industries. Such organisations may outsource many security functions to manage their security services from Managed Security Service Providers (MSSPs) for monitoring network activities and perform vulnerability testing and intrusion detection. Secure Works, BT Managed Security Solutions Group, IBM, Verizone, AT&T and Symantec are leading providers of MSSP services.
 - **Security issues for cloud computing and mobile digital platform:** Cloud computing and the mobile digital platforms have become the backbone of data collection, analytics and then predictions. These technologies potential to deliver powerful benefits. But at the same time, these technologies have given a few challenges to system security and reliability. We now describe some of these challenges and how they should be addressed.
- 1 **Security in the cloud:** Web-based firms which are very sophisticated and use cloud service may experience security collapses. The organization which owns the sensitive data has accountability and responsibility for protection. Understanding how the cloud computing provider organizes its services and manages the data is a little complex.

Cloud computing services are made distributed. Cloud systems reside in large remote data centers and server farms providing multi-company clients with enterprise and data management. Cloud providers also assign work to data centers around the world in order to save resources and keep costs down. No one knows exactly where the data is located while using the cloud.

The downside is, however, that it is difficult to monitor illegal activity due to the distributed existence of cloud computing. Almost all cloud providers use encryption to protect data they control when transmitting the data, for example, with the Secure Sockets Layer (SSL). But it is important to ensure that the data is encrypted if data is stored on devices that also store data by other companies.

Companies expect their systems to be running day and night continuously, but cloud providers haven't always been able to provide this kind of service. On several occasions over the past few years, the cloud services of Amazon.com and Salesforce.com experienced outages that interrupted business operations for millions of users.

Cloud users must ensure that they are secured at a level that satisfies their business requirements, regardless of where their data is saved. The cloud provider can enter and process data under the data security laws of certain jurisdictions in some jurisdictions. Cloud customers should find out how their company data are isolated from the other companies by a cloud provider and obtain evidence of a sound encryption process. It is also important to know how the cloud provider will respond in the event of a catastrophe, whether the provider will fully recover your data and how long. Users in the cloud must also inquire if cloud services will be subject to external audits and security approvals. Such reviews can be written into the SLA agreement before a cloud provider is signed.

- 2 **Securing mobile platforms:** If mobile devices perform many of the computer functions, they have to be protected against malware, theft, accidental loss, unauthorized entry and hacking, such as desktops and laptops. Special protection is required for mobile devices which access company systems and data. Companies should ensure that their corporate security strategy encompasses mobile devices and specifics of how to support, secure and use mobile devices. Mobile device management tools are necessary to approve all devices in use, keep correct inventory data on all mobile devices, users and apps, maintain updates of applications and lock or remove devices lost or stolen so that they cannot be jeopardized. Corporate guidelines for licensed mobile platforms and software applications as well as required software and remote access procedures of company systems should be established by businesses.

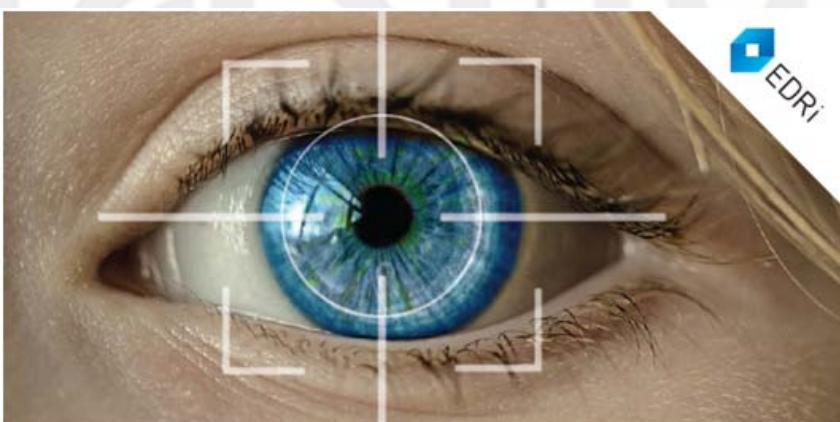
Companies can, wherever necessary, encrypt contact. The password feature found on each Smartphone should be needed for all mobile device users. Some businesses demand that workers only use smartphones from the company. Since BlackBerry devices run on their own safe systems, they are considered safest. But more and more businesses are empowering employees to make employees more accessible and efficient on their own devices, including iPhones and Android phones. For the isolation of corporate data stored in personal mobile devices from their personal information, protecting software products like the Good Technology tools are now available.

11.8 SECURITY MEASURES AND ENFORCEMENT

Taking into consideration information is the most precious asset of an organization; information security is one of the most significant areas for every business and individual. Looking at the big picture, approximately 86% of all websites had a serious vulnerability which is an observation omni presents in past and in present too.

11.8.1 Biometric Security Measures

In order to grant or deny entry, biometric authentication uses devices that read and interpret individual human traits, such as fingerprints, irises and voices. Biometric authentication is based on a physical or behavioral characteristic measurement, which is specific for each person. It compares the unique characteristics of a person, such as fingerprints, face or retinal images, to a stored profile, to see if any variations exist between them and the stored profile access is given when the two profiles match. Finger printing and face recognition technologies have only recently begun to be used in several laptops with fingerprint authentication systems, as well as many models with built-in webcams and face recognition apps, and for security applications. Financial service firms such as Vanguard and Fidelity have implemented voice authentication systems for their clients.



*Source: edri.org

Fig 11.9: Biometric

11.8.2 Non- Biometric Security Measures

Connecting to the Internet will be very risky without protection against malware and intruders. The essential business tools have been firewalls, intrusion detection systems and antivirus software. These are explained below in detail:

- **Firewalls:** Unlicensed users cannot access private networks with firewalls. A firewall is a hardware-to-software combination that controls traffic input and output. It is typically positioned between private internal networks and distrustful external networks such as the Internet, though a portion of the company's network can also be shielded by firewalls from the remainder of the network.

The firewall functions as a porter that checks the credentials of each user before a network access is provided. It defines input traffic names, IP addresses, applications and other features. This information is managed by the network administrator against the access rules that the system has programmed. Firewall prohibits unwanted contact into the network and out of it and lies on a specially designated device in large organizations which is isolated from the rest of the network, so that no incoming request has direct access to private network resources. There are many technologies for firewall screening including static packet filtering, state-of-the-art inspection, network address translation and proxy filtering. They are also used as a firewall security mix.

The packet filter analyses the selected fields of the data packet header, which scans individual packets isolated between the trusted network and the Internet. This filtering technology can skip several forms of attacks. Full inspection offers greater security by assessing whether shipments are part of ongoing conversation between sender and recipient. It develops tables for tracking information in several shipments. Packs are allowed or rejected for the purpose of belonging to the permitted discussion or attempting to have a legitimate relationship. When static packet filtering and inspections are carried out, Network Address Translation (NAT) may provide additional layer security. NAT masks the IP addresses of the internal host computer of the company in order to avoid revealing sniffer programmes outside the firewall and use that information to infiltrate internal systems.

Filtering the application proxy checks the packet application content. A proxy server pauses, inspects, and transfers a proxy to the other side of the firewall data packets originating outside of the company. If a user outside the company wishes to connect with the user inside the company, the external user can speak to the proxy application first and the proxy application contacts the internal device of the company. Likewise, in the company a computer user moves through the proxy to converse with outside machines. To build a successful firewall, an administrator must maintain detailed internal rules that define the authorised or denied individuals, applications, or addresses. Firewalls can disrupt the penetration of the network by externals, but they cannot entirely prevent them from doing so.

- **Intrusion Detection Systems:** Commercial protection vendors also offer software and services for detecting intrusions against suspicious network traffic and for attempting to access files and databases in addition to the firewalls. Full-time monitoring tools for detect and deter intruders are included in intrusion detection systems at the most vulnerable points or "hot spots" of the business networks. If a suspicious or anomalous incident happens, the device may trigger an alert. Scanning software searches for trends that indicate known methods of attacking machine,

such as bad passwords and checks if essential files were deleted or changed. Computer monitoring examines incidents when security attacks are detected. If an unwanted traffic is received, the intrusion detection instrument may also be modified to shut down a specifically sensitive part of the network.

- **Antivirus and Antispyware Software:** The defense protection plans need to protect all devices, both for individuals and companies, against malware. Malware such as computer viruses, computer worms, tropical horses, spyware and adware is stopped and detected by antiviral. Most antivirus software is effective only when it is written against already known malware. To continue to be effective, the antivirus software must be continuously updated.
- **Unified Threat Management Systems (UTM):** Since a huge cost is applied to avail such security services and it is not easy to access such facilities by small and medium business organisations, security products with reduced costs and improved manageability are introduced in the market which have combined security methods into a single appliance and include firewalls, virtual private networks, intrusion detection systems, and Web content filtering and anti-spam software. These comprehensive security management products are called unified threat management (UTM) systems. Although initially aimed at small and medium-sized businesses, UTM products are available for all sizes of networks. Major players of UTM in the market are Crossbeam, Fortinent, and Check Point, and networking vendors such as Cisco Systems and Juniper Networks provide some UTM capabilities in their equipment.

11.8.3 Cyber-Physical Security System

Cyber-Physical Security Systems (CPSS) equipment can play an important role in enhancing the security of the organisations. However, they must not be deployed in isolation. Cyber Physical Security System technologies are only as effective as the overall security plans, processes and procedures they support. CPSS should be implemented as part of a larger, coordinated safety strategy of the organization that takes into account the impact on the networks, security personnel and employees. There are various types of cyber physical security systems:

- **Surveillance:** Video cameras can deter crime, identify campus visitors, and provide real-time information during an active threat situation. Passive Monitoring refers to recorded data that is analyzed at a later time, usually as part of an event investigation. Active Monitoring involves personnel watching a live video feed. Some districts have agreements with law enforcement to provide real-time video feed access during a security incident.
- **Communications equipment and platforms:** Wired and wireless communication technologies, such as intercom systems, local alarm enunciators, phone systems, and two-way radios are used by school officials and emergency personnel during emergencies. Enhanced 911 (E911) and other location-based communications identify the location

from which calls or messages are sent. Attendance and Check-In Apps can be used to track student presence on campus and allow school staff to account for students during an emergency incident.

- **Sensors and alarms:** sensors and alarms can be used to notify personnel on and off campus that an emergency is taking place. Mapping and verification solutions can help personnel the exact location of the emergency and provide audio and/or video input officials determine the nature of the threat.
- **Duress alarms (panic buttons):** These are wired or wireless devices that can be used to notify school officials and emergency personnel about an emergency. Some devices also transmit the sender's identity in addition to location. Door and Window Sensors can send alerts or trigger alarms when doors and windows have been breached. Gunshot Detectors can identify the location and caliber of a gunshot. They can be integrated with comprehensive security systems which can alert authorities, point cameras at the impacted area, and lock doors.
- **Robots:** Robots integrate a number of security features, including facial and object recognition and streaming video, can serve as the eyes and ears for emergency responders.
- **Lighting:** It should be considered to provide safe passage in an emergency and improve overall campus security. In addition to highlighting emergency exit routes, lighting can be used for communications, such as allowing law enforcement to identify locations that have been cleared during a security incident.
- **Fogging and pepper spray systems:** It creates a smokescreen or deploy chemical aversive and are often put in vestibules. However, these run the risk of hampering responder operations and can be compromised or misused.

11.8.4 Access Control

Access Control is the selective restriction of access to places or other resources. Access control can be accomplished by using a human resource (such as a security guard), mechanical means (such as locks and gates) or a technological solution (such as swiping an ID card). Examples of access control solutions include:

- **Locks, Gates, and Vestibules:** Experts recommend that university campuses be closed during the worked day with only one entrance point and software enabled cameras are there. Office personnel may clear outsiders to enter through a secure vestibule, which may be built of bullet-proof glass or enhanced with a shatter-proofing film with a software enabled camera are equipped.
- **Metal Detectors:** Some university use metal detectors to prevent students, staff, or visitors from bringing guns or other weapons onto the university campus.

- **Door Barriers:** These retrofit security devices turn the door into a barricade to help prevent an attacker from gaining access. Although effective, these products may conflict with local fire codes.
- **Entry Cards:** Entry cards can be used with or without embedded technology. ID cards provide a visual indication of whether or not an individual is authorized to be on a university campus. Some university systems issue ID cards to students, faculty and staff. Visitors may receive guest badges or adhesive stickers. Smart ID cards include a chip that can be used together with a reader to identify student locations during an emergency or allow school staff to unlock doors. Biometric readers such as fingerprint scanners can be used for the same purposes.
- **Access Software:** Specialized software, often used in school offices or other campus entry points, can track visitor histories, print temporary badges, and check databases for registered sex offenders. Facial Recognition software can be used to prevent unapproved individuals from entering a building, match visitors against criminal databases, or help ensure that students board the correct bus. However, this software is in its infancy and concerns have been raised about accuracy and student privacy. Along the same lines, object recognition technology can be used to identify weapons or other prohibited objects. Central Lockdown Capability consists of integrated security systems that can automatically trigger a school lockdown when a panic button is activated, an alarm goes off, or a gunshot is detected.

11.8.5 Ensuring Software Quality

Otherwise, companies can improve system quality and reliability through the use of software measures and rigorous software testing, as well as implement effective security and controls. Software metrics are machine objective evaluations in the form of calculated quantifications. Ongoing use of the metrics helps the IT and end users to collectively assess the system output and detect issues when they arise. Software metrics are examples of how many transactions can be performed in a given unit of time, how much time online reply time, how many paid checks are shown every hour and how many errors are known per 100 lines of programme code. Metrics must be planned, formalised, objective and regularly used in order to be efficient.

Early, reliable and comprehensive testing can greatly contribute to the consistency of the system. Many regards checking as a way of demonstrating the correctness of their work. We know, in fact, that all the big software has errors and we have to test to detect these errors.

Good testing starts before a software application even uses a systematic analysis — a small group of people who have carefully chosen the expertise required for the particular goals to be tested. When developers begin to write programmes, they may also use coding to rewrite the code. Code must be checked, however, by running a programme. If mistakes are found, a procedure called debugging will find and remove the source.

Check Your Progress B:

- 1) What are the methods for encrypting network traffic on the Web?

.....
.....
.....
.....
.....

- 2) How do sensors and alarms help in ensuring cyber-physical security?

.....
.....
.....
.....
.....
.....
.....

- 3) What do you understand by security outsourcing?

.....
.....
.....
.....
.....
.....

- 4) What are biometric security measures?

.....
.....
.....
.....
.....
.....

11.9 LET US SUM UP

Now, almost every business has a data driven processes. If a machine or a computer starts running business transactions, the business person might not be able to sell to the customers or place orders with the suppliers when the machine is not in order. It may also happen sometimes that an intruder tries to penetrate the computer system and steals or destroys business data, confidential payment details of the customers.

When a large volume of digital information is stored, it is vulnerable to many other types of threats. Information systems can be interconnected at multiple locations through computer Networks. And hence, the intruder's attack or an unauthorized access can anytime happen at any access point in the computer network, which can destroy the whole network. Instead of computer networks, the systems connected through Internet, are more vulnerable because they are open to anyone in the whole world. The Internet is so big that it can have an incredibly widespread effect when abuses happen. Wireless networking provides many advantages, but it is also coupled with various security threats. Implementation of technological solutions to wireless security threats and vulnerabilities, wireless security is a primary necessity of an organization.

A hacker is an intelligent coder whose aim is to achieve access to a computer system of another user. They can request malicious files without any human intervention, destroy useful data, transmit data, and install a hidden program running in the background to monitor user actions. They are experts and know methods of gaining unauthorized access by finding weaknesses in the security protections employed by Web sites and computer systems. The purpose of hacking a system is to steal data or secrete information, to damage system, defacement, destruction of a Web site or corporate information system etc.

Cyber forensic is a branch of digital science in computers and digital storage media which has facts. In order to respond to legal action, data protection and control management have become extremely essential. Today, a lot of the evidence is available in digital form for inventory fraud, misappropriation, theft of business secret data, cyber crime and several civil cases.

Encryption is one of the most common methods to protect digital information stored or shared by the organisations over the Internet. It is the process of transforming plain text or data into encrypted data, called cipher text so that an unauthorized person cannot read it. It can be read only by receiver and sender. A secret numerical code, called an encryption key is used to transforms plain data into cipher text. The message must be decrypted by the receiver.

Biometric authentication uses devices that read and interpret individual human traits, such as fingerprints, irises and voices. Biometric authentication is based on a physical or behavioral characteristic measurement, which is specific for each person. Connecting to the Internet will be very risky without protection against malware and intruders. The essential business tools for non-biometric security measures are have been firewalls, intrusion detection systems and antivirus software etc.

Cyber-Physical Security Systems equipment can play an important role in enhancing the security of the organisations. However, they must not be deployed in isolation. Cyber Physical Security System technologies are only as effective as the overall security plans, processes and procedures they support. CPSS should be implemented as part of a larger, coordinated safety

strategy of the organization that takes into account the impact on the networks, security personnel and employees.

Access Control is the selective restriction of access to places or other resources. Access control can be accomplished by using a human resource (such as a security guard), mechanical means (such as locks and gates) or a technological solution (such as swiping an ID card). Examples of access control solutions include locks, gates, and vestibules, metal detectors, door barriers, entry cards, access software etc.

11.10 KEYWORDS

Cyber Forensic: Cyber forensic is a branch of digital science in computers and digital storage media which has facts. Its goal is to examine digital media in a forensically sound manner with the aim of identifying, preserving, recovering, analyzing and presenting facts and opinions about the digital information.

Deep Packet Inspection (DPI): DPI examines data files and sorts out low-priority online material while assigning higher priority to business-critical files. Based on the priorities established by a network's operators, it decides whether a specific data packet can continue to its destination or should be blocked or delayed while more important traffic proceeds.

Door Barriers: Door barriers retrofit security devices turn the classroom door into a barricade to help prevent an attacker from gaining access. Although effective, these products may conflict with local fire codes.

Duress Alarms (panic buttons): These are wired or wireless devices that can be used to notify school officials and emergency personnel about an emergency. Some devices also transmit the sender's identity in addition to location. Door and Window Sensors can send alerts or trigger alarms when doors and windows have been breached.

Pay- per- Click Fraud: Click fraud occurs when an individual or computer program deceitfully clicks on an online ad without any intention of learning more about the products displayed in the ad to purchase it. Click fraud has become a serious problem at Google and other Web sites that feature pay-per-click online advertising.

Recovery-Oriented Computing: This involves the design of quick-recovery systems and the implementation of operators' skills and tools to detect and quickly remedy error sources in multi-components systems.

SQL Injection Attacks: SQL injection attacks take benefit of weak points of web application software which are not robust in terms of security check or which do not have sufficient code written into them for data security.

11.11 TERMINAL QUESTIONS

- 1) What are various types of malicious software's/malwares which induce cyber crimes?
- 2) What are cyber crimes? State various types of cyber crimes occurring these days.
- 3) What is cyber forensic?
- 4) What are the various ways of securing network transactions?
- 5) What are the various ways of securing the business on internet?
- 6) What are the various non-biometric security measures?
- 7) What are the various types of cyber physical security systems?
- 8) State various access control solutions.



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 12 IT ACT 2000

Structure

- 12.0 Objectives
- 12.1 Introduction
- 12.2 Definition
- 12.3 Formulation of IT Act 2000
- 12.4 Amendments in IT Act 2000
 - 12.4.1 Amendment Act, 2008 IT Act 2008
- 12.5 Digital Signature & Encryption
- 12.6 Attribution
- 12.7 Acknowledgement and Dispatch of Electronic Records
- 12.8 Regulation of Certifying Authorities
- 12.9 Digital Signatures Certificates
- 12.10 Duties of Subscribers
- 12.11 Penalties and Adjudication
- 12.12 Procedure, Working & Legal Position in Digital Signature
- 12.13 Appellate Tribunal
- 12.14 Offences and Cyber-Crimes
- 12.15 E-Signature and Digital Signature
- 12.16 Encryption
- 12.17 Let Us Sum Up
- 12.18 Keywords
- 12.19 Answer to check your Progress
- 12.20 Terminal Questions
- 12.21 Further Readings

12.0 OBJECTIVES

After studying this unit, you should be able to:

- understand the meaning and significance of Information Technology Act;
- explain how IT Amendment Act 2008 came into force;
- describe different provisions of the Act; and
- recognize the meaning of cybercrime and various offences.

12.1 INTRODUCTION

The Information Technology Act was passed as a response to the developments in the IT Sector, to facilitate e-commerce and e-governance, and to control cybercrimes. Internet has become a necessity today and with its increased penetration, clarity was needed in the domain, IT Act was an attempt to provide much needed clarity and direction. This unit discusses various facet of IT Act 2000 and IT Amendment Act 2008.

12.2 DEFINITION

The Information Technology Act, 2000 is the law pertaining to information technology. IT Act, 2000 was the result of passing of the IT the Bill by both the houses of Parliament. The Act is grounded on the United Nations Commission on International Trade Law (UNCITRAL). It deals with E-commerce and cybercrimes. It is, *"An Act to provide legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication, commonly referred to as electronic commerce"*. The Act came into force on 17.10. 2000.

12.3 FORMULATION OF IT ACT 2000

The advent of internet and then the growth in internet-based business transactions necessitated the formulation and implementation of law to regulate the field. The digital technology has transformed our lives, more and more individuals and businesses are adopting it and are conducting several activities with help of it. Before the formulation of IT Act 2000, the overall environment was of apprehension. Individuals and businesses were aware of the advantages this digitalisation brought along, but at the same time they were hesitant to conduct activities, especially monetary transactions owing to the lack of a legal framework which would protect them from some untoward incidents. To match steps with the strides being taken in digital world, the UNCITRAL adopted the Model Law on Electronic commerce in the year 1996. India was also a signatory to this and hence was expected to introduce laws as per the Model Law. Keeping in view, these factors the IT Bill was introduced to facilitate E-commerce as well as E-governance.

The IT Bill was drafted in the year 1998. Then the bill was then put in front of Parliamentary standing committee wherein, certain modifications were suggested. Finally, the IT Ministry suggested some changes and the approved modifications were retained in the bill and the rest were discarded. The bill was approved by the Union cabinet and then both the houses of Parliament. The President of India also provided his assent to the Bill and it became an Act that came into force on 17th October, 2000. The IT Act, 2000 brought in amendments into the Indian Penal Code 1860, the Indian Evidence Act 1872, Bankers Book Evidence Act 1891 and the Reserve Bank of India Act 1934, thereby incorporating the issues related to crimes and evidences based on

electronic mode and to address the need for regulations pertaining to electronic transfer of funds.

12.4 AMENDMENTS IN IT ACT 2000

The Information Technology Act was enacted in the year 2000 to bring in the necessary changes for growth of digitalisation and e-commerce transactions, and ensure safety and security of such transactions, thereby preventing crimes. The act was then amended to account for the developments in the domain, these amendments were passed by both the houses of Parliament in 2008 and received President's assent on 5th February, 2009, thus becoming the Amendment Act. It introduced various positive developments. It was seen as an effort by the Government of India to create a policy that is able to maintain pace with the evolving technology. The Indian Computer Emergency Response Team (CERT-In) is responsible for administration of the Act. The amendment attempted to fill in the gaps left by the earlier Act, and address the security concerns.

The Act was the need of the hour as with increasing digitalisation, the crimes in the digital space or with the help of digital aids also proliferated. Sending/sharing offensive content, phishing, identity theft, frauds, etc. were crimes which had to be brought within the ambit of penal provisions. All these factors led to the amendments in IT Act 2000, thus paving the way for IT Act 2008. The IT Act 2008 revolutionized the cyber law framework of the nation. The Act addressed various issues such as incorporating electronic signature, inclusion of greater number of cyber offences, addressing the concerns pertaining to data protection, privacy, and also dealt with the issues related to use of digital/cyber medium for terrorism.

12.4.1 Amendment Act, 2008 IT Act 2008

The significant contributions of the Amendment Act 2008 are as follows:

- The Act introduced several definitions to bring in more clarity and make it more inclusive:
 - i) Electronic signature “means authentication of any electronic record by a subscriber by means of the electronic technique specified in the second schedule and includes digital signature”
 - ii) Communication Device “means Cell Phones, Personal Digital Assistance (Sic), or combination of both or any other device used to communicate, send or transmit any text, video, audio, or image.”
 - iii) Cyber cafe “means any facility from where access to the internet is offered by any person in the ordinary course of business to the members of the public.”
 - iv) Cyber Security “means protecting information, equipment, devices, computer, computer resource, communication device and information stored therein from unauthorized access, use, disclosure, disruption, modification or destruction.”

- v) The Act also revised the definition of "Intermediary with respect to any particular electronic records, means any person who on behalf of another person receives, stores or transmits that record or provides any service with respect to that record and includes telecom service providers, network service providers, internet service providers, web hosting service providers, search engines, online payment sites, online-auction sites, online market places and cyber cafes. (Substituted vide ITAA-2008)".
- The Act also brought in changes while addressing the penalties and compensations for damage to computer, computer system, etc. If an individual "destroys, deletes or alters any information residing in a computer resource or diminishes its value or utility or affects it injuriously by any means; steals, conceals, destroys or alters or causes any person to steal, conceal, destroy or alter any computer source code used for a computer resource with an intention to cause damage; he shall be liable to pay damages by way of compensation not exceeding one crore rupees to the person so affected."
- Computer Related Offences inserted sections relating to "punishment for sending offensive messages through communication services". It further said, "any electronic mail or electronic mail message for the purpose of causing annoyance or inconvenience or to deceive or to mislead the addressee or recipient about the origin of such messages (Inserted vide ITAA 2008) shall be punishable with imprisonment".

Several other changes were also introduced. These major changes have been discussed in upcoming sections.

Check Your Progress A

1. What was the need for IT Act 2000?

.....
.....
.....
.....
.....

2. What prompted the amendments in IT Act, 2000?

.....
.....
.....
.....
.....

3. Fill in the blanks:

- i) The IT Act came into force on _____.
- ii) IT Act 2000 was amended in the year _____.

- iii) The _____ is responsible for administration of the Act.
- iv) _____ means Cell Phones, Personal Digital Assistance (Sic), or combination of both or any other device used to communicate, send or transmit any text, video, audio, or image

12.5 DIGITAL SIGNATURE & ENCRYPTION

Under the provisions of IT Act 2000, digital signature may be used by any subscriber for the purpose of authentication of an electronic record. The electronic record is authenticated with the help of “*asymmetric crypto system and hash function which envelop and transform the initial electronic record into another electronic record.* (Section 2(1)(p) of the Information Technology Act, 2000).”

Traditionally, the signature by an individual on any document helps in authentication of the document and provides an assurance to the receiver regarding its trustworthiness. This is possible in case of a paper-based document, but in case of electronic document, just mentioning the name at the end of document or email provides almost no reassurance regarding its authenticity. The IT Act, 2000 recognizes public key cryptography for the safeguarding of electronic documents. The Section 3 of the Act further provides a user the power for authentication of an electronic record by affixing his digital signature. The authentication process will apply “asymmetric crypto system and hash function that envelopes and transforms the initial electronic record into another record”. The electronic record can be verified by any other person who is in the possession of the public key. Furthermore, every subscriber has a private as well as a public key which are unique to him and which constitutes a functioning key pair. The creation of digital signature requires application of encryption to specific information. The process involves following steps:

- The message that has to be signed using digital signature is outlined, and then processed with the help of an algorithm called hash function. The processed output thus received is called the hash result which is unique to the message.
- This hash result so produced is encrypted using the private key of the sender. This is the Digital Signature.
- The Digital Signature is then attached to the message which is then transmitted over to the receiver through internet.
- Once the message is received at the receiver’s end, he uses the public key of the sender to decrypt the message. If the sender’s message is successfully decrypted using his public key and the hash result is computed and compared with the output of the digital signature, then the receiver is assured of the authenticity and integrity of the message.

12.6 ATTRIBUTION

The communication taking place through electronic medium does not have any tangible component. Therefore, it becomes difficult to affix responsibilities and define associations. The term attribution means “the action of ascribing a work or remark to a particular author, artist, or person.” The IT Act 2000 (Section 11) lays down the guidelines about how an electronic document can be attributed to the individual from whom it originated. It says that the electronic document will be attributed to the originator under following conditions:

- If the originator himself sent the electronic record
- If an individual who was given the authority by the originator to act on his behalf in respect of that particular electronic record has sent it.
- If it was sent by using information system which was programmed by the originator himself or on his behalf to automatically send the electronic record

For example, if an email was sent to B from A, then A will be the originator of the electronic record and B will be the addressee in this case.

12.7 ACKNOWLEDGEMENT AND DISPATCH OF ELECTRONIC RECORDS

Section 12 of the IT Act deals with the manners in which acknowledgement of the receipt of electronic record may be made and Section 13 of the IT Act discusses the time of receipt of an electronic record.

If the originator of the electronic record has not specified any particular mode of acknowledgement to be given by the receiver regarding the receipt of the record, the acknowledgement can be given by “any communication by the addressee, automated or otherwise” or “any conduct of the addressee, sufficient to indicate to the originator that the electronic record has been received.” For example, if an individual receives a mail for a meeting, the individual can send a mail to the sender saying thank you for the information, or sends an automated response or shows interest by joining the meeting. These activities show acknowledgement from the receiver end.

Also, in cases where the originator of the electronic record has “stipulated that the electronic record shall be binding only on receipt of an acknowledgment of such electronic record by him, then unless acknowledgment has been so received, the electronic record shall be deemed to have been never sent by the originator.” But in cases where the originator has not specified that the electronic record will be binding only upon the receipt of acknowledgement and the acknowledgment has not been received by the originator within the time specified or agreed or, if no time has been specified or agreed to within a reasonable time, then the originator may give notice to the addressee stating that no acknowledgment has been received by

him and specifying a reasonable time by which the acknowledgment must be received by him and if no acknowledgment is received within the aforesaid time limit he may after giving notice to the addressee, treat the electronic record as though it has never been sent.”

The section 13 of the IT Act talks about dispatch of electronic record. It is stated that, the time at which an individual sends the electronic record and it enters a computer outside the ambit of control of the sender, is the time of dispatch. Also, the place of origin of dispatch is the place of business of the sender and the place of receipt is the place of business of the receiver.

12.8 REGULATION OF CERTIFYING AUTHORITIES

The Information Technology Act specifies that the “Controller of Certifying Authorities” may be appointed by Central Government. The controller of certifying authorities has the authority regarding the regulation of certifying authorities. The Government at the Centre may also appoint Deputy Controllers, Assistant Controllers, other officers and employees as they deem fit.

The authority need to assign tasks and functions to the Deputy Controllers and Assistant Controllers lies with the Controller. The Controller’s functions include: supervising the activities of the Certifying Authorities, specifying their duties, certifying their keys, laying down standards for them, taking decisions regarding the requirements pertaining to the desired qualification and relevant experience of the Certifying Authorities, etc. The Controller has to certify the public keys of Certifying Authorities and also has to resolve the conflict of interests between them and the subscribers.

The Controller has the authority for the recognition of foreign Certifying Authority as a Certifying Authority with the prior approval of the Central Government, the Controller may also revoke the recognition if he is satisfied “that any Certifying Authority has contravened any of the conditions and restrictions subject to which it was granted recognition”. The Act also provides that any individual can apply for license to the Controller for the purpose of issuing Electronic Signature Certificates in India. The license may be issued if the concerned person satisfies the requirements laid down by the Central Government and is valid only for the period prescribed by the Central Government. For renewing the license, the application has to be accompanied by prescribed fees and the application has to be made forty five days before the date of expiry of the existing license. The application for license may be approved or rejected depending on the merits of the case and the documents accompanying the application. The Controller has the authority to suspend the license, if he is satisfied after an enquiry that false and incorrect statements have been made by the Certifying Authority and the conditions under which the license was issued have not been complied with, but before revocation the Certifying Authority has to be given a reasonable chance of being heard.

The Controller also has the power for the delegation of any of his powers to the Deputy Controller, Assistant Controller or any other officer. The Controller or any other official, who has been authorised by him, has the authority to start the investigation/enquiry regarding any infringement of the IT Act, any other rules or regulations. They will also have access to: “any computer system, any apparatus, data or any other material connected with such system” for the purpose of information retrieval. Also, “the Controller or any officer authorised by him in this behalf shall exercise the like powers which are conferred on Income-tax authorities under Chapter XIII of the Income-tax Act, 1961 (43 of 1961), and shall exercise such powers, subject to such limitations laid down under that Act.”

In case of the Certifying Authorities, they have to make sure that they are following the procedures and protocols as prescribed by the Act and they also have to ensure that their employees also abide by the procedures and protocols. They are expected to adhere to security protocols and use resources which are secure from malicious attacks. They also have to display the license at a conspicuous place within their premises and in case the license is suspended or revoked; they are expected to submit it immediately. It also has to adhere to the disclosure norms so as to maintain sanctity of the process and in case of a situation where in the integrity of their computer systems may be affected; they should notify the concerned stakeholders.

12.9 DIGITAL SIGNATURE CERTIFICATES

The IT Act 2000 talks about digital signature certificates which is a digital key which validates and certifies the identity of the person holding it, and is issued by the certifying agencies. The digital signature certificate verifies the authenticity of the electronic record and ensures that it wasn't altered during the transit. The important characteristics of digital signature certificates are:

- These certificates help in authentication of the message source as the ownership is bound to a specific user.
- They help in providing an assurance that the message was not altered during the transit.
- Non-repudiation is ensured as the sender can not deny sending a message bearing his digital signature.

Any individual can apply for the issue of digital signature certificate by filling up the form and depositing the required amount of fee (not to exceed INR 25,000). The certifying authority may issue the certificate if it finds the application to be in required order. These certificates can only be issued by certifying authority.

12.10 DUTIES OF SUBSCRIBERS

After the issuance of Digital Signature Certificates, the subscribers are expected to perform certain duties as prescribed by the Act. The subscriber

has to take utmost care to hold the control of the private key which corresponds to the public key listed in the Digital Signature Certificate. It is important that he takes all necessary precautions to avoid the leak of the private key, and in case the private key gets compromised he should immediately communicate this to the certifying authority. The subscriber shall be held liable till the time the certifying authority has been informed regarding the breach.

12.11 PENALTIES AND ADJUDICATION

The Information Technology (Amendment) Act, 2008 added several crimes related to cyber space and also introduces penalties for control of such crimes. With increasing penetration of digitalization, the flow of information has been transformed. While there are myriads of advantages of usage of digital media, it is not untouched by increasing crimes. The cyberspace has removed the barriers of geography and has made knowledge/information volatile. To prevent the misuse of information and thus losses accruing out of it, the IT act introduced penalties. The chapter IX of the IT Act discusses Penalties, Compensation and Adjudication.

The penalties for various offences are as follows:

- **Section 43:** “Penalty and Compensation for damage to computer, computer system, etc (Amended vide ITAA-2008)”. This section says, if any individual who is not authorised to access/use a computer, computer system or computer network accesses it ,or extract data from it in any form, introduces virus in it or is responsible for some action rusting in virus attack, disrupts it, tampers it, or destroys , deletes or alters any information contained therein will be held responsible for the payment of damages by the way of compensation to the affected person. The compensation should not exceed one crore rupees. This is also applicable in cases wherein he denies the access to authorised person, provides assistance to other for malicious activities, or steals, conceals or destroys the source code of the computer resource with the intention of causing damages.
- **Section 43 A:** “Compensation for failure to protect data (Inserted vide ITAA 2006, Change vide ITAA 2008)”.This section deals with cases of negligence, and says “Where a body corporate, possessing, dealing or handling any sensitive personal data or information in a computer resource which it owns, controls or operates, is negligent in implementing and maintaining reasonable security practices and procedures and thereby causes wrongful loss or wrongful gain to any person, such body corporate shall be liable to pay damages by way of compensation, not exceeding five crore rupees, to the person so affected.”
- **Section 44:** “Penalty for failure to furnish information, return, etc”

This section discusses penalties resulting from the failure to furnish information, or record, file return, maintain books of account or records. If an individual who is required by the Act to provide information or

return or report to controller or certifying authority, fails to fulfill the requirement, he will be held, “liable to a penalty not exceeding one lakh and fifty thousand rupees for each such failure”. If he fails to “file any return or furnish any information, books or other documents within the time specified therefore in the regulations fails to file return or furnish the same within the time specified therefore in the regulations, he shall be liable to a penalty not exceeding five thousand rupees for every day during which such failure continues” and if he is required by the Act to maintain a book of account or maintain certain records, fails to do so, “he shall be liable to a penalty no exceeding ten thousand rupees for every day during which the failure continues.”

- **Section 45:** “Residuary Penalty”:

If an individual acts in opposition to any rule and regulation that has been laid down by the IT Act, for which any specific penalty has not been mentioned in the Act, he will be held liable for the payment of compensation of an amount not exceeding 25000 rupees to the individual who gets impacted by the action or a penalty of an amount not exceeding 25000 rupees.

Adjudication

For adjudication pertaining to the matters discussed in the chapter, Central Government has the power to appoint an adjudicating officer. The “Adjudicating Officer should not be below the rank of a director to the GoI or an equivalent officer of a state”. An individual should be appointed adjudicating officer only if he has relevant “experience in the field of IT and legal or judicial experience as prescribed by the Central Government”. While imposing penalties or awarding compensation, the adjudicating officer shall give reasonable opportunities for representation and should award compensation or penalise only when he is fully satisfied. The adjudicating officer “shall have the powers of a civil court which are conferred on the Cyber Appellate Tribunal under sub-section (2) of section (2) of section 58.” Section 47 of the Act discusses the factors which should be considered by the adjudicating officer while awarding compensation. It says that the officer should be mindful of the gains of unfair advantage which resulted from the default, “the amount of loss caused to the aggrieved party as a result of the default, and the repetitive nature of the default.”

Check Your Progress B

1. What are Digital Signature Certificates?

.....

.....

.....

.....

.....

.....

2. What do you mean by Attribution?

3. Fill in the blanks:

- i. The IT Act, 2000 recognizes _____ cryptography for the safeguarding of electronic documents.
- ii. Section _____ of the IT act discusses Penalty and Compensation for damage to computer, computer system, etc.
- iii. Section _____ of the IT Act discusses Residuary Penalty.
- iv. The subscriber shall be held liable till the time the certifying authority has been informed regarding the breach. (**True/False**)

12.12 PROCEDURE, WORKING & LEGAL POSITION IN DIGITAL SIGNATURE

Digital Signatures have been recognised by Indian legal system under the guidelines issued by IT Act 2000. The Act was an outcome of increased focus on improving the ease of doing business in India and to bring in necessary changes to facilitate the digital transactions. The digital signature ensures that the electronic record is authentic and the content/message has not been tampered with. The IT Act 2000 talks about Digital Signature, while in the ITAA 2008 electronic signature has been mentioned. Digital Signature has been defined as “authentication of electronic record” which happens as per the procedures laid down by the Act. But the IT Act of 2000 included the use of “asymmetric crypto system, public key infrastructure and hash function”, thus making it dependent on limited infrastructure only. The introduction of Electronic Signature in IT Act, 2008; brought in technological neutrality and broadened the ambit by covering digital signature as well as other forms such as biometric. Also, it is important to understand that digital (or electronic) signature is not same as scanned copy of signature or a digitized copy, or any other conventional form of signature, it pertains to the authentication of electronic record as per the procedures laid down by Section 3 of the IT Act.

The digital signatures use Public Key Infrastructure and are created and verified with its help. To encrypt and decrypt these signatures, two keys namely are required: public key and private key. The public key is required to encrypt the data which is then decrypted with the help of private key. The public key is shared but the private key used for decrypting is known only to the possessor of the key. The system is based on cryptography.

The signature of an individual is a representation of his identity. It holds a significant legal position and represents the identity as well as intent of the concerned person. The IT Act provided same legal status to digital/electronic signature as the hand-written signature. The concept is based on UNCITRAL Model Law on Electronic Signatures, 2001. These signatures serve the same purpose as traditional signatures. In the digital world wherein, electronic records are being transmitted, the digital signature ensures the authenticity and legitimacy of the electronic record. They are safer than traditional signatures and can not be forged. It is far more convenient to use digital signature.

12.13 APPELLATE TRIBUNAL

The IT Act 2000 provides for the establishment of Cyber Appellate Tribunal. The Act states: “The Central Government shall, by notification, establish one or more appellate tribunals to be known as the Cyber Regulations Appellate Tribunal.” The central government also has the power to specify the matters and places w.r.t. which the Tribunal may exercise its jurisdiction.

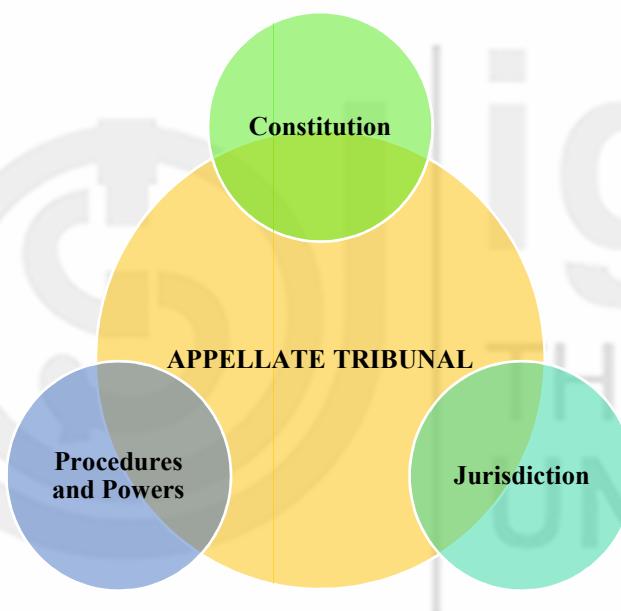


Fig 12.1: Appellate Tribunal

- **Constitution:** The Tribunal shall consist of only one person: The Presiding Officer of the Cyber Appellate Tribunal. The Presiding officer is appointed by the Central Government, and the necessary qualifications for the same are: he will be qualified for the appointment only if he “is, or has been, or is qualified to be, a Judge of a High Court; or is or has been a member of the Indian Legal Service and is holding or has held a post in Grade I of that Service for at least three years.” The Presiding officer shall hold the position for 5 years or until he is 65 years of age (Whichever is earlier). The Central Government, in consultation with the Chief Justice of India will be responsible for the selection of chairperson and members of the Tribunal. Also, “The Central Government shall provide the Cyber Appellate Tribunal with such

officers and employees as the Government may think fit" and these people will work under the superintendence of the Presiding Officer.

- **Jurisdiction:** Any individual who is aggrieved pertaining to the orders of a controller or an adjudicating officer may appeal to the Cyber Appellate Tribunal. The appeal has to be filed within 45 days from the date when the order was received by the concerned person. If the aggrieved individual is not satisfied by the decision of Tribunal, he may file an appeal with the High Court.
- **Procedures and Powers:** The Act states that, "The Cyber Appellate Tribunal shall not be bound by the procedure laid down by the Code of Civil Procedure, 1908 but shall be guided by the principles of natural justice and, subject to the other provisions of this Act and of any rules, the Cyber Appellate Tribunal shall have powers to regulate its own procedure including the place at which it shall have its sittings.". The Tribunal will have same power as civil court (as vested under Code of Civil Procedure, 1908) for the purpose of carrying out its functions in matters such as: summoning and enforcing attendance, requiring the discovery and production of records, receiving evidence, reviewing decisions, etc. The proceedings before the tribunal will be deemed "to be a judicial proceeding within the meaning of sections 193 arid 228, and for the purposes of section 196 of the Indian Penal Code and the Cyber Appellate Tribunal shall be deemed to be a civil court for the purposes of section 195 and Chapter XXVI of the Code of Criminal Procedure, 1973."

12.14 OFFENCES AND CYBER-CRIMES

The advent of internet has transformed our lives. People in every sphere of life are using computers and internet to create, transmit and store information. The information is volatile in nature and is often misused by miscreants, thereby causing harm to others. With increasing penetration of internet and adoption of digital tools and techniques, global connectivity has reached new heights, but at the same time has become even more vulnerable resulting in increased numbers of crimes. To control such malicious activities and deter the miscreants the IT Act was introduced with provisions for addressing these issues. Chapter XI of the IT Act discusses criminal offences which are punishable by fine or imprisonment or both.

Cybercrimes is an umbrella term which includes the criminal activities involving computer/internet/cyberspace. It is basically criminal exploitation of computer and/or internet. These crimes are of sophisticated nature and in these crimes the computer is usually the tool or target or both. It includes:

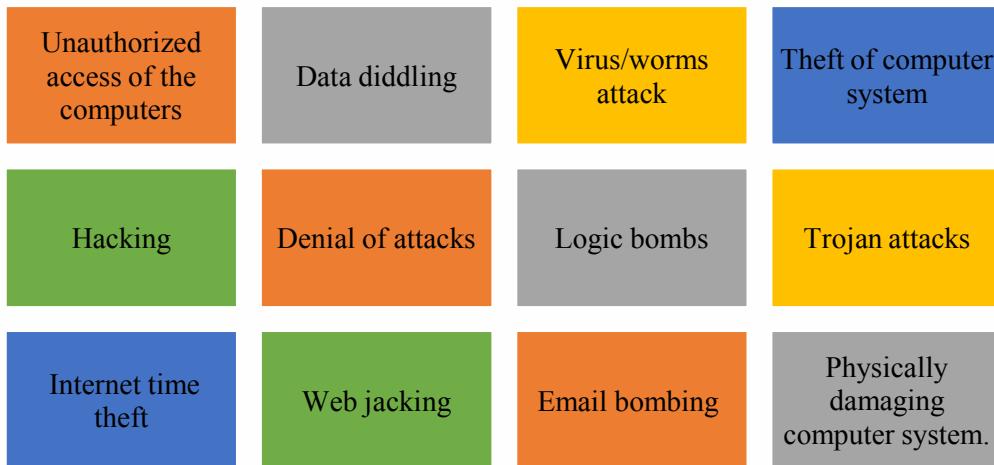


Fig 12.2 : Cyber Crimes

The Indian law does not provide any specific definition of cybercrime, but the term cyber security has been defined, it “means protecting information, equipment, devices, computer, computer resource, communication device and information stored therein from unauthorized access, use, disclosure, disruption, modification or destruction.” Even though cyber-crime has not been defined in the IT Act but offences and crimes relating to computers and cyberspace have been dealt in detail in the IT Act. Following offences have been included in IT Act:

Table 12.1: Offences and their punishments

Section	Offence	Punishment
Section 65	Tampering with computer source documents	Imprisonment up to three years, or with fine which may extend up to two lakh rupees, or with both.
Section 66	Computer related offences	Imprisonment for a term which may extend to three years or with fine which may extend to five lakh rupees or with both.
Section 66 B	Punishment for dishonestly receiving stolen computer resource or communication device	imprisonment of either description for a term which may extend to three years or with fine which may extend to rupees one lakh or with both.
Section 66 C	Punishment for identity theft	Imprisonment of either description for a term which may extend to three years and shall also be liable to fine which may extend to rupees one lakh.
Section 66 D	Punishment for cheating by personation by using computer resource	Imprisonment of either description for a term which may extend to three years and shall also be liable to fine which may extend to one lakh rupees.

Section 66 E	Punishment for violation of privacy	Imprisonment which may extend to three years or with fine not exceeding two lakh rupees, or with both.
Section 66 F	Punishment for cyber terrorism	Imprisonment which may extend to imprisonment for life
Section 67	Punishment for publishing or transmitting obscene material in electronic form	Imprisonment of either description for a term which may extend to five years and also with fine which may extend to ten lakh rupees.
Section 67 A	Punishment for publishing or transmitting of material containing sexually explicit act, etc., in electronic form	Imprisonment of either description for a term which may extend to seven years and also with fine which may extend to ten lakh rupees.
Section 67 B	Punishment for publishing or transmitting of material depicting children in sexually explicit act, etc., in electronic form	Punished on first conviction with imprisonment of either description for a term which may extend to five years and with fine which may extend to ten lakh rupees and in the event of second or subsequent conviction with imprisonment of either description for a term which may extend to seven years and also with fine which may extend to ten lakh rupees.
Section 67 C	Preservation and retention of information by intermediaries	Punished with an imprisonment for a term which may extend to three years and also be liable to fine.
Section 68	Power of Controller to give directions	Imprisonment for a term not exceeding two years or a fine not exceeding one lakh rupees or with both.
Section 69	Power to issue directions for interception or monitoring or decryption of any information through any computer resource	Imprisonment for a term which may extend to seven years and shall also be liable to fine.

			Cyber Security Measures
Section 69 A	Power to issue directions for blocking for public access of any information through any computer resource	Imprisonment for a term which may extend to seven years and also be liable to fine.	
Section 69 B	Power to authorise to monitor and collect traffic data or information through any computer resource for cyber security	Imprisonment for a term which may extend to three years and shall also be liable to fine.	
Section 70	Protected system: Any person who secures access or attempts to secure access to the protected system in contravention of provision of Sec. 70	Imprisonment of either description for a term which may extend to ten years and shall also be liable to fine.	
Section 70 B	Indian Computer Emergency Response Team to serve as national agency for incident response	Imprisonment for a term which may extend to one year or with fine which may extend to one lakh rupees or with both.	
Section 71	Penalty for misrepresentation	Imprisonment for a term which may extend to two years, or with fine which may extend to one lakh rupees, or with both.	
Section 72	Penalty for Breach of confidentiality and privacy	Imprisonment for a term which may extend to two years, or with fine which may extend to one lakh rupees, or with both.	
Section 72 A	Punishment for disclosure of information in breach of lawful contract	Imprisonment for a term which may extend to three years, or with fine which may extend to five lakh rupees, or with both.	
Section 73	Penalty for publishing[electronic signature] Certificate false in certain particulars	Imprisonment for a term which may extend to two years, or with fine which may extend to one lakh rupees, or with both.	
Section 74	Publication for fraudulent purpose	Imprisonment for a term which may extend to two years, or with fine which may extend to one lakh rupees, or with both	

The Act will also apply to contraventions conducted outside India if it involves computer, computer system or computer network based out of India.

12.15 E-SIGNATURE AND DIGITAL SIGNATURE

The IT Act of India discusses two types of signatures:

- Electronic Signature, and
- Digital Signature.

Important points for comparison have been summarised below:

- Section 2(1) (ta) of the IT Act 2008 defines Electronic Signature as: “electronic signature means authentication of any electronic record by a subscriber by means of the electronic technique specified in the Second Schedule and includes digital signature”. The section 2(1) (p) of the IT Act 2000 talks about Digital Signatures and defines it as “digital signature means authentication of any electronic record by a subscriber by means of an electronic method or procedure in accordance with the provisions of section 3” of the Information Technology Act.
- Electronic Signatures are technologically neutral and the act does not specify any particular technology for the purpose of creation of electronic signature while digital signature follows specific technology-based approach. For example, usage of hash functions, use of public key cryptography system, etc.
- Electronic Signature can be biometric, name typed at the end of a mail, digitalized version of conventional signature. Digital signature uses two-way protection system with encryption and decryption.
- Digital Signatures are more authentic than electronic signatures.
- Electronic signatures are used for the purpose of verification of document while Digital Signatures are used for securing the document.
- Digital Signatures have limited validity of maximum three years, while electronic signatures have no such limits on validity.

12.16 ENCRYPTION

A Digital Signature is used for the authentication of an electronic record. These signatures are created and verified with the help of cryptography. The authentication process involves two other processes: Encryption and Decryption.

Encryption involves transformation of simple messages into cipher text while the process of decryption reverses the coded texts into the actual simple message.

Encryption-Decryption has two forms:

- Symmetric Encryption: It is the most basic kind of encryption involving only one secret key for the purpose of encryption and decryption of information. The key is known to both: the sender as well as the receiver of the message.
- Asymmetric Encryption: There are two keys involved in this case for encrypting/decrypting messages: public key and private key or secret key. Section 2(1)(f) of the Information Technology Act 2000 talks about this kind of encryption. The encryption is done using the public key which is known to many but decryption can only be done by the individual who has the private key known to the receiver only. It helps in protecting the digital signature from forgery. Asymmetric encryption is a relatively modern method.

Check Your Progress C

1. What are the different kinds of encryption?

.....
.....
.....
.....
.....
.....
.....

2. Explain the constitution and jurisdiction of Cyber Appellate Tribunal.

.....
.....
.....
.....
.....
.....
.....
.....

3. Fill in the blanks:

- Digital Signatures have been recognised by Indian legal system under the guidelines issued by _____.
- _____ is the most basic kind of encryption involving only one secret key for the purpose of encryption and decryption of information.
- There are two keys involved in the case of _____ for encrypting/decrypting messages: public key and private key or secret key
- The Tribunal shall consist of only one person: The _____ of the Cyber Appellate Tribunal.

12.17 LET US SUM UP

The Information Technology Act, 2000 is the law pertaining to information technology. IT Act, 2000 was the result of passing of the IT the Bill by both the houses of Parliament. The Act is grounded on the United Nations Commission on International Trade Law (UNCITRAL). It deals with E-commerce and cybercrimes.

Under the provisions of IT Act 2000, digital signature may be used by any subscriber for the purpose of authentication of an electronic record. The electronic record is authenticated with the help of “*asymmetric crypto system and hash function which envelop and transform the initial electronic record into another electronic record.* (Section 2(1)(p) of the Information Technology Act, 2000).”

The communication taking place through electronic medium do not have any tangible component. Therefore, it becomes difficult to affix responsibilities and define associations. The term attribution means “the action of ascribing a work or remark to a particular author, artist, or person.” The IT Act 2000 (Section 11) lays down the guidelines about how an electronic document can be attributed to the individual from whom it originated.

If the originator of the electronic record has not specified any particular mode of acknowledgement to be given by the receiver regarding the receipt of the record, the acknowledgement can be given by : “ any communication by the addressee, automated or otherwise” or “any conduct of the addressee, sufficient to indicate to the originator that the electronic record has been received.” For example, if an individual receives a mail for a meeting, the individual can send a mail to the sender saying thank you for the information, or sends an automated response or shows interest by joining the meeting. These activities show acknowledgement from the receiver end.

The IT Act 2000 talks about digital signature certificates which is a digital key which validates and certifies the identity of the person holding it, and is issued by the certifying agencies. The digital signature certificate verifies the authenticity of the electronic record and ensures that it wasn’t altered during the transit.

12.18 KEY WORDS

Attribution: The action of ascribing a work or remark to a particular author, artist, or person.

Digital Signatures: Digital signature means authentication of any electronic record by a subscriber by means of an electronic method or procedure in accordance with the provisions of section 3.

Digital Signature Certificate: The digital signature certificate verifies the authenticity of the electronic record and ensures that it wasn’t altered during the transit.

Electronic Signature: Authentication of any electronic record by a subscriber by means of the electronic technique specified in the Second Schedule and includes digital signature.

Encryption: Encryption involves transformation of simple messages into cipher text while the process of decryption reverses the coded texts into the actual simple message.

IT Act: An Act to provide legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication, commonly referred to as electronic commerce.

12.19 ANSWER TO CHECK YOUR PROGRESS

- A) i. 17.10. 2000 ii. 2008 iii. Indian Computer Emergency Response Team (CERT-In) iv. Communication Device
- B) i. Public key ii. 43 iii. 45 iv. True
- C) i. IT Act 2000 ii. Symmetric Encryption iii. Asymmetric Encryption iv. Presiding Officer

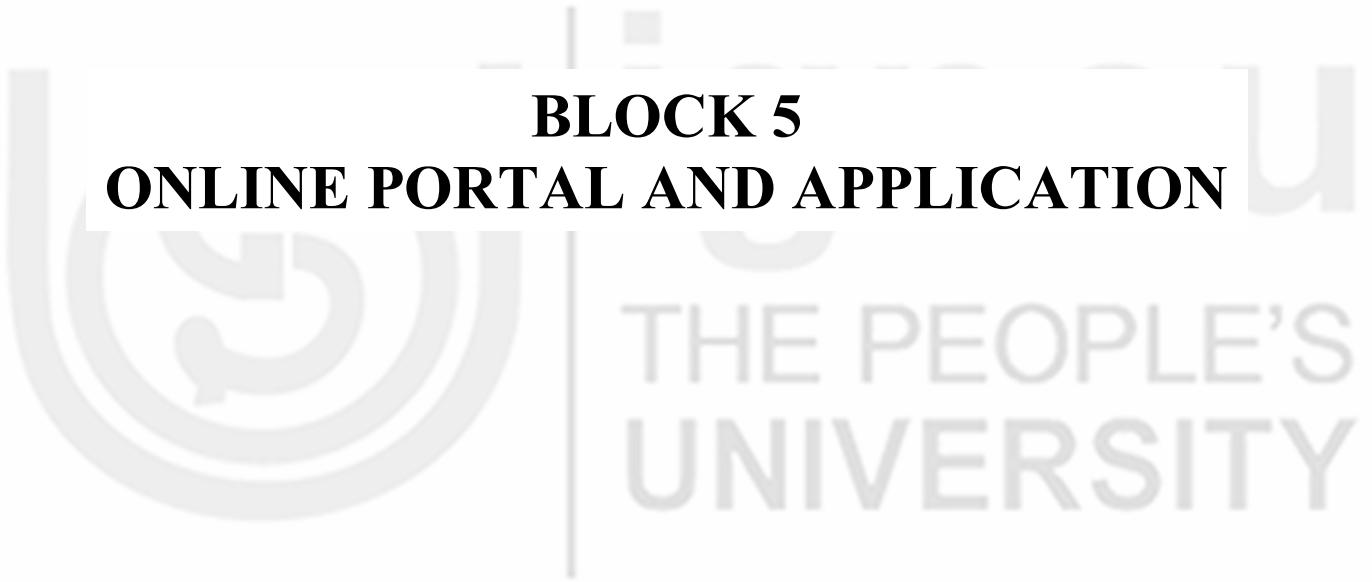
12.20 TERMINAL QUESTIONS

1. Write brief notes on following:
 - i) Certifying Authority
 - ii) Duties of Subscribers
 - iii) Appellate Tribunal
 - iv) Encryption
2. Differentiate between the following:
 - i) Digital Signature and Electronic Signature
 - ii) IT Act 2000 and IT (Amendment) Act 2008
3. Explain the process of encryption in Digital Signatures.
4. Explain the process pertaining to Acknowledgement and dispatch of electronic records.
5. What are cyber-crimes?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.



BLOCK 5

ONLINE PORTAL AND APPLICATION

BLOCK 5 ONLINE PORTAL AND APPLICATION

This is the fifth and last block of the course “E-Commerce”. This block will familiarise you about the electronic retailing, aid of the internet in various services and application based sales and exchange of goods and services. This block is structured to make learners understand the usages of various online portals and apps for various types of services. The block on the theme “Online Portal and App: Business, Shopping and Services” comprises of three units, the detail of which is mentioned below:

- **Unit-13:** this unit explains the concept of e-shopping & e-tailing and how it is different from reationg, various advantages and disadvantages of e-retailing for both the buyers and retailers. The unit also explains the various e-tailing models along with e-tailing mix and the overview of e-tailing in Indian context.
- **Unit-14:** This unit explains the significance of the internet in various services such as financial services, travel services, auction services, learning, travel, publishing and entertainment industry etc.
- **Unit-15:** This unit makes the learners familiar with app based commerce. the units briefs about the concept behind app development, business framework, appropriate technology and marketing strategies for creating apps.

UNIT 13 E-TAILING

Structure

- 13.0 Objectives
 - 13.1 Introduction
 - 13.2 E-tailing
 - 13.3 E-tailing Models
 - 13.4 E-retail Mix-Sale the 7Cs
 - 13.5 E-tailing in India
 - 13.6 Let Us Sum Up
 - 13.7 Key Words
 - 13.8 Answers to Check Your Progress
 - 13.9 Terminal Questions
-

13.0 OBJECTIVES

After studying this unit, you should be able:

- explain the concept of E-tailing;
 - understand the advantages and disadvantages of E-tailing to the retailers and buyers;
 - understand the models of E-tailing;
 - understand the E-retail mix; and
 - understand the E-tailing in India.
-

13.1 INTRODUCTION

E-shopping or Online Shopping is the process of buying goods and services from merchants who sell their products on the Internet. Finding a product online is much easier than looking for it in the local store. Electronic retailing (E-tailing) is the sale of goods and services through the Internet. It can include business-to-business (B2B) and business-to-consumer (B2C) sales of products and services. It requires companies to tailor their business models to capture Internet sales, which can include building out distribution channels such as warehouses, internet webpage, and product shipping centres. Notably, strong distribution channels are critical to electronic retailing as these are the avenues that move the product to the customer. It includes a broad range of companies and industries. However, there are similarities between most E-tailing companies that include an engaging website, online marketing strategy, efficient distribution of products or services, and customer data analytics.



Fig 13.1: E-tailing

Successful e-tailing requires strong branding. Websites must be engaging, easily navigable, and regularly updated to meet consumers' changing demands. Products and services need to stand out from competitors' offerings and add value to consumers' lives. Also, a company's offerings must be competitively priced so that consumers do not favour one business over another on a cost basis only. E-tailers need strong distribution networks that are prompt and efficient. Consumers cannot wait for long periods for the delivery of products or services. Transparency in business practices is also important, so consumers trust and stay loyal to a company.

13.2.1 E-TAILING

Retail is the process of selling consumer goods or services to customers through multiple channels of distribution to earn a profit. Retailers satisfy demand identified through a supply chain. The term "retailer" is typically applied where a service provider fills the small orders of many individuals, who are end-users, rather than large orders of a small number of wholesales, corporate or government clientele. Thus, Retail is the sale of goods on a physical location where the seller and the buyer meet in person. Whereas e-tail is the sale of goods on the internet where the transaction happens in a digital environment. Various popular players of E-tailing are Amazon, Flipkart, Zomato, Swiggy, MakemyTrip etc, and for retailers are Walmart, McDonalds, Big Bazaar etc.

E-Tail Vs. Retail



E-Tail



Retail

Fig 13.2: E-Tail v/s Retail

E-tailing stands for E-retailing also known as e-retail as “*sales of goods and services via the internet or other electronic sources, for personal and household use by consumers*”.

The term E-Retailing was first developed in the European countries. It has both passive and interactive retail system while all e-tailing is generally limited to passive, air ticketing and other entertainment booking is designed in interactive system mostly. E-tailing has various features as stated below:

- Saves time and efforts.
- Convenience of shopping at home.
- Wide variety/range of products.
- Good discounts / lower prices.
- Get detailed information about the product.
- Easy comparison of various models/brands.

There are many types of E-tailers most popular of these two are:

1. **Pure Play (Virtual) e-retailers-** Retailers that only do the electronic transactions and do not have any physical outlet for the customers. For example- Amazon & Flipkart
2. **Brick and click (Click-and-mortar) e-retailers-** Retailers who do the both online and offline transactions i.e. through internet and physical outlets. For example, Dell.

E-tailing has various advantages as well as disadvantages both for there tailers as well as buyers as explained below:

Advantages of E-tailing for retailers:

1. **Location utility:** Location is utmost important for the conventional retailing process to provide convenience utility to its consumers. However, in e-tailing location is not important. Retailers and customers need internet for e-tailing and transaction can happen from anywhere from within the country or overseas.
2. **Less expensive:** As compare to organised retailing, e-tailing is less expensive as it saves wages of salesmen and premises cost and maintenance. These expenditures are low as compare to internet cost.
3. **High Reach:** Integration with customers is high in e-tailing as customers can be local, national and international. Through internet, e-tailers can reach to large audience.
4. **24*7 businesses:** The time utility for customers is high in e-tailing as customers can buy the products and services from anywhere and anytime.
5. **Feedback:** It's easy to manage customer relationship management in e-tailing on the basis of feedback of consumers.

Disadvantages of E-tailing for retailers

1. **Lack to infrastructure:** The issues of accessibility and connectivity of internet causes problems in functioning of e-tailing activities. Also, the initial investment cost is very high in e-tailing.
2. **Lack of technological expertise:** To start an online retailing project it is important to have technological expertise and not all retailers have it.
3. **Complex logistic management:** Intrinsic and extrinsic challenges increase the complexities in e-tailing logistics. Like cash on delivery increases the operational cycle, managing high rates of returns, poor logistic management in rural areas and problems in cross-nation shipments.
4. **Customers' expectations:** In terms of flexibility in delivery, detailed product descriptions, cost and security of delivery, flexible payment options sets high expectations of customers.
5. **Lack of personal touch:** The lack of face-to-face interaction, persuasion and handling the customers' query is a major disadvantage in e-tailing.
6. **High competition:** E-tailers have to compete with other e-tailers as well as the organised and unorganised retailers in the market that increase the competitions for them.

Advantages of E-tailing for buyers

1. Time utility as consumers can shop 24*7
2. Place utility as consumers can shop from anywhere
3. Convenience utility as consumers can shop from any mode via computer, laptops or mobile
4. Option utility as consumers can get wide range of option via e-tailing

Disadvantages of E-tailing for buyers

1. Customers may be uncertain regarding the quality of the products and services offered online
2. Fear regarding online fraud and loss of money
3. Every time not every product is available.
4. Lack of technological know-how

13.3 E-tailing Models

Two models of E-tailing are explained below:

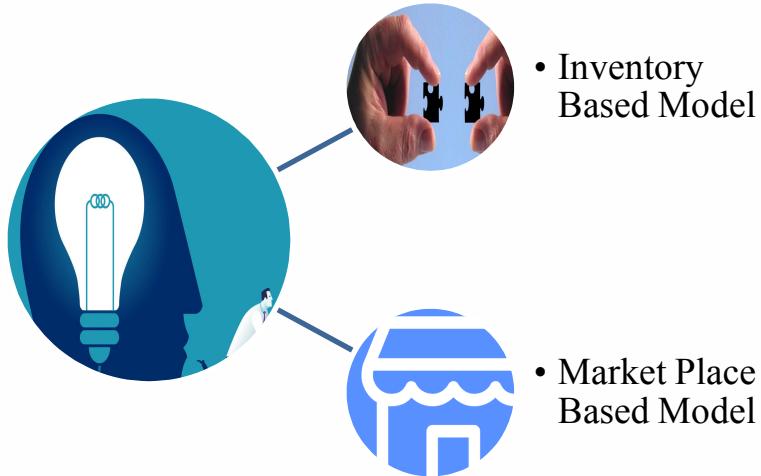


Fig 13.3: E-tailing Business Model

- 1. Inventory based model:** According to the FDI policy in India, “Inventory model of e-commerce means an e-commerce activity where inventory of goods and services is owned by e-commerce entity and is sold to the consumers directly.” It includes the e-tailing activities where inventory of products and services is owned by e-tailers and it is directly sold to customers. The main feature of this model is end to end process i.e., from initiating from product purchase to managing logistics and finally dispatching the products. Example- Alibaba, Jabong.
- 2. Marketplace based model:** According to the FDI policy guideline, “Marketplace model of e-commerce means providing of an information technology platform by an e-commerce entity on a digital and electronic network to act as a facilitator between buyer and seller.” This model provides a platform where buyers and sellers do the transactions in efficient, transparent and trusted environment. Here, buyers can compare the prices and accordingly place the orders to the authorized sellers on the website. Majorly, e-tailers like Amazon, Patym mall and Flipkart practice the marketplace-based model. For example, when buyer login to Amazon India and place an order to a registered seller, Amazon India act as a mediator here. Subsequently, the registered seller takes care of logistics and dispatching of the products to the customers.

Check Your Progress A:

- What do you understand by pure play E-retailer?

.....

.....

.....

.....

- What are the disadvantages of E-tailing for retailers?

.....

.....

.....

3. What are the advantages of E-tailing for buyers?

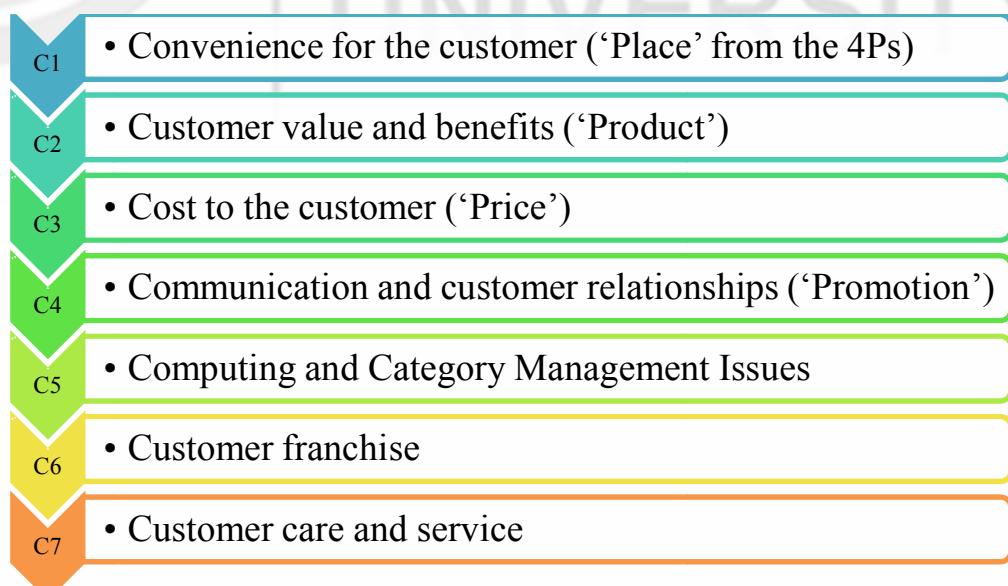
.....
.....
.....
.....

4. What is Inventory based model?

.....
.....
.....
.....

13.4 E-RETAIL MIX- SALE THE 7Cs

E-retail mix is defined as the different techniques and tools e-retailers use to provide values for customers. The e-tailing mix is the combination of 7Cs and first four Cs are similar to the 4Ps proposed by E. Jerome McCarthy's (1960) i.e. Place, Product, Price and Promotion. In 1990 Lauterborn proposed 4 Cs namely Convenience for the customer; Customer value and benefits; Cost to the customer; and Communication. However, with paradigm shift, more Cs added in the list i.e., Customer relationships; Computing and category management issues; Customer franchise and Customer care and service. Customer relationship is emphasis on long-term relationship with consumers and follows continuous interaction with them. Therefore, customer relationship merged with communication and finally there are 7 Cs.



*Source: The authors, developed from McCarthy's (1960) 4Ps and Lauterborn's (1990) 4Cs.

Fig 13.4: E-Retail Mix- Sale the 7cs

The following table briefly describes **the 7Cs – the (E-) Retail Mix.**

E-Tailing

C1: Convenience for the customer ('Place' from the 4Ps)

- Physical location
- Multi-channel options: browse the web, buy in store or *vice versa* – or buy on the web, return to the store for a refund
- Virtual location and ease of finding the website: registration with search engines, location in e-malls and links from associates
- Website design: connectivity; navigation; ‘shelf’ space allocation and ease of purchase.
- Layout: ‘free-flow’; ‘grid’; or ‘free-grid’

C2: Customer value and benefits ('Product')

- Satisfactions wanted by customers
- Solutions to problems or good feelings
- Specify (sometimes design) products reflecting closeness to the customer and benefits that customers want
- Selecting the range of products offered for sale – assembled for target markets from diverse sources
- Wide and/or deep range – where the ‘clicks’ e-retailer can score relative to the ‘bricks’ retailer
- Content: describing a compelling offer of products clearly in customer value and benefits terms
- Customisation of products to match the wants of customer segments as closely as possible

C3: Cost to the customer ('Price')

- The real cost that customers will pay including transport, carriage and taxes
- Costs of Internet telephone access
- Customers’ perceptions that prices should be cheaper online than in store

C4: Communication and customer relationships ('Promotion')

Communication is a two-way process also involving feedback from customers to suppliers, including:

- Marketing research surveys
- Public relations (PR)
- Direct mail
- E-mail
- Internet
- Offline advertising such as magazines and ‘click here’ sections of newspapers

- Online methods include banner ads and pop-ups (often incentivised); paid-for listings in search engines and directories; and affiliate programmes
- Atmospherics and Web atmospherics: visual (décor, colour management, video clips, 3D), smell (perfume and samples), touch (smooth and cool or soft and cuddly – communicated by visuals or samples) and oral (music). (But need to avoid long download times – ‘click here for broadband’).
- Customer relationships
 - In store sales representatives use verbal and non-verbal (body language) communication
 - Marketing database and loyalty schemes
 - The e-retailer can enhance product value using Customer Relationship Management (CRM) and data mining to tailor products specifically to individual customers.

C5: Computing and Category Management Issues

- Supplying the products that customers want, in the right sizes and quantities, at the right time and in the right place
- Efficient supply chains with computer network links between suppliers and retailers Minimising stocks and speed of response: QR or ECR
- Co-operation between suppliers and (e-) retailers aiming to improve the efficiency of satisfying customers whilst minimising stocks and costs. On the larger scale, this is ‘Category management’ (CM), the retailer/supplier process of managing categories as strategic business units
- Efficient logistics systems are an important component of Customer care and service

C6: Customer franchise

- Image, trust and branding – long-term investment in quality, corporate communications and Customer care and service
- Safeguards including fraud protection and dispute resolution
- Safe shopping icons, e.g. Webtrader

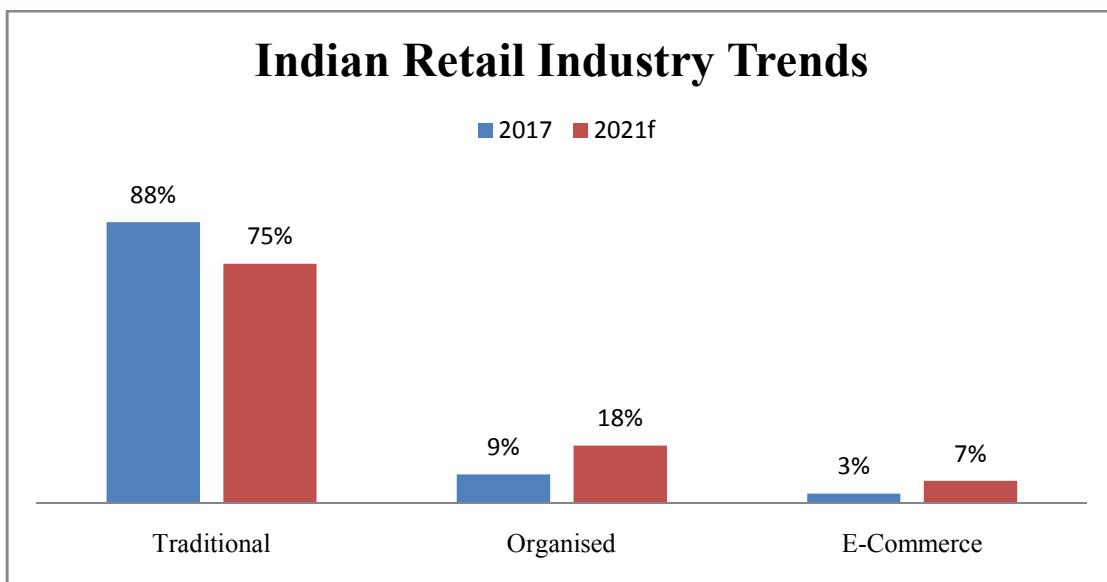
C7: Customer care and service

- Creating assortments at competitive prices in an accessible format
- Fast and reliable deliveries at times convenient to the shopper
- Availability of help; return and refund facilities
- For the ‘bricks’ retailer store personnel are crucial
- For the e-retailer click-through telephone help, bulletin boards and chat rooms make the experience more interactive and add community.

- Addressing customer concerns, particularly for credit card security, e.g., displaying the ‘padlock’ secure site logo.

13.5 E-TAILING IN INDIA

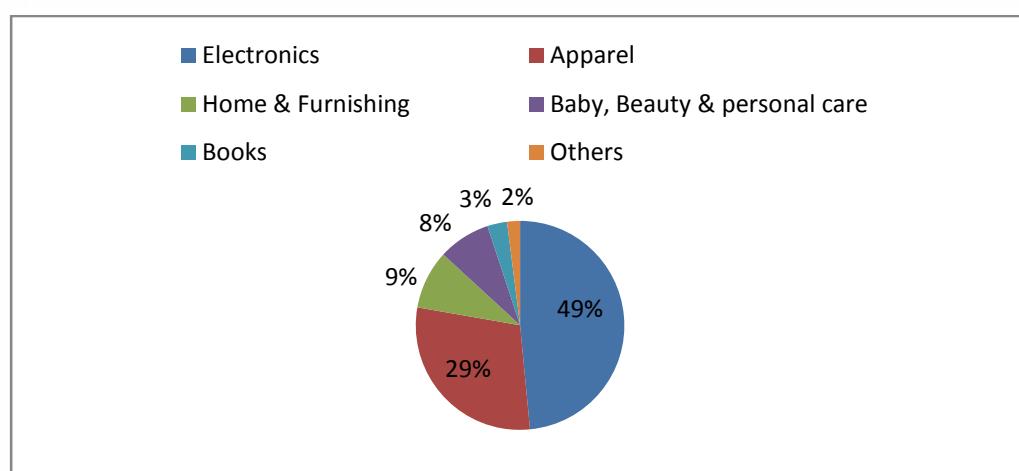
In India, e tailing has substantially grown and still penetrating in the market owing to internet accessibility and smart phone availability. In addition, e-banking services and digital wallets have fuelled the e-tailing trends in India. Hence, e-retailers are strategizing the approaches to gain the Indian market by Omni-channels method, celebrity endorsement, social media marketing and digital influencers.



*Source: KONNECTED to consumers; Economist Intelligence Unit, accessed in April 2018; Media articles; Indian Retail Industry: Growth, Trends, Challenges, and Opportunity, India Retailing, 16 November 2017; Deloitte analysis.

Fig 13.2: Indian Retail Industry Trends

As per the recent reports and analysis, the e-tailing market has been taken over by electronics and apparel. So, game changer events in E-tailing industry in India as are internet penetration, usage of mobile, advent of social commerce, adoption of technology, omni-channels and digital wallets. The following are the major categories of products sold in e-tailing.



*Source: Industry discussions, KPMG in India analysis

Fig 13.3: E-Retail Market by Value

Key players

Following are key E-tailers in India, as brief of all are explained below:

1. **Amazon:** Amazon is an American multinational conglomerate technology company based in Seattle, with 750,000 employees. It deals in e-commerce, artificial intelligence, digital streaming and cloud computing. Amazon was founded by Jeff Bezos in July 1994 in Bellevue. The company initially started as an online marketplace for books but later diversified in selling electronics, software, video games, apparel, furniture, food, toys, and jewellery. Amazon when talked in terms revenue is the largest internet company and one of the world's most valuable company. Amazon offer different products, some of which are as following –
 - 1) Consumer Devices – Echo Devices, Fire Stick, Fire TV, Kindle E-Reader
 - 2) Streaming Services – Amazon Prime, Amazon Music, Twitch and audible subsidiaries
 - 3) Cloud Computing services – Amazon web Services
 - 4) Artificial Intelligence – Alexa (virtual Assistance)
 - 5) Online payment portal – Amazon Pay



Fig 13.4: Amazon

2. **Flipkart:** Flipkart is an Indian e-commerce company based in Bengaluru, India. It was founded by Sachin Bansal and Binny Bansal in 2007, both ex-employee of Amazon. Just Like Amazon, the company started with focus on online book sales, and later expanding into other product such as consumer electronics, fashion, home essentials & groceries, and lifestyle products. Flipkart plays a dominant role in the sale of apparel after its strategic acquisitions of Myntra and Jabong.com. Its main rival is Amazon and Snapdeal. Flipkart also owns PhonePe, a mobile payment service. In August 2018, U.S.-based retail chain Walmart acquired a 77% controlling stake in bidding war with Amazon for US\$16 billion, valuing it at \$20 billion. Flipkart has launched video streaming named Flipkart Video in competition with Amazon Prime video services.



Fig 13.5: Flipkart

3. **Snapdeal:** Snapdeal is an Indian e-commerce company based in New Delhi, India. It was founded by Kunal Bahl and Rohit Bansal on 4 February 2010 as a daily deals platform, but later expanded in September 2011 to become an online marketplace and later became one of the India's largest market place. Over the years Snapdeal have done multiple number of acquisitions to strengthen their market intelligence, presence and upgrade their technological platform like mobile payment service freecharge.com. In April 2017 Snapdeal was actively in talks with Flipkart for the merger after Softbank, one of the major investors in Snapdeal wanted the company to merge. But finally, the deal was scraped due to reservation on Flipkart's terms by other investors. This breakdown of deal was followed by Snapdeal's founders taking a decision to continue operating Snapdeal as an independent company with Snapdeal 2.0 as their new version and vision.

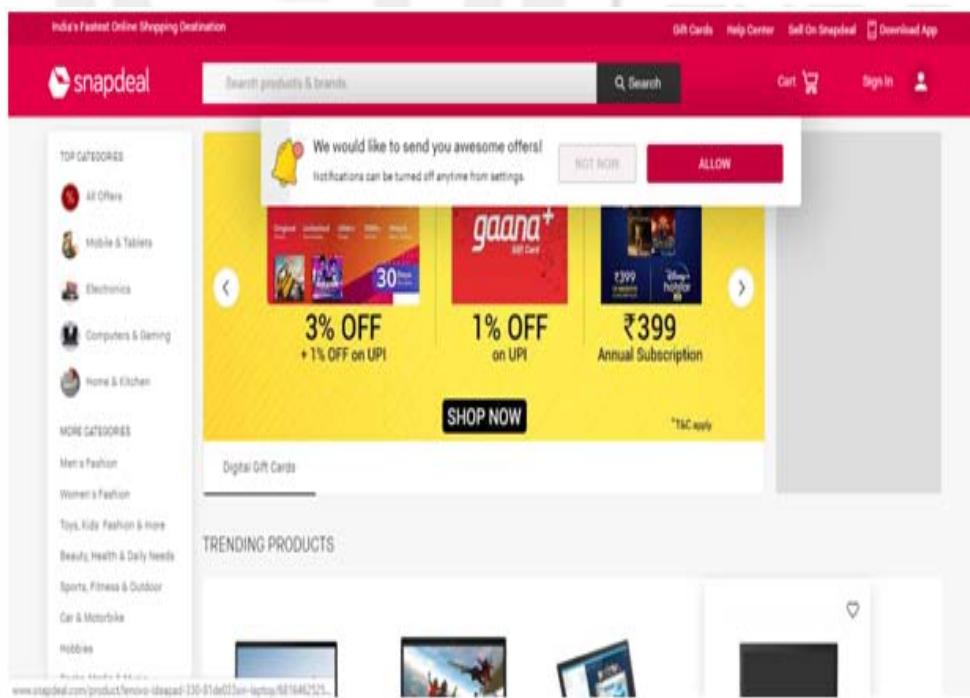


Fig 13.6: Snapdeal

- 4. IndiaMART:** IndiaMART InterMESH Ltd. is an Indian e-commerce company that provides B2C, B2B and customer to customer sales services via its web portal. The company has headquarter in Noida, Uttar Pradesh, India. The group was founded in 1996 by Dinesh Agarwal and Brijesh Agrawal. Its main rival is Alibaba, a Chinese giant which deals in similar business model. Over the last 10 years, IndiaMART has become the largest e-commerce platform for businesses with about 60% market share. It handles more than 95,000 product categories ranging from machine parts, electrical components, medical equipment and textile products to cranes.

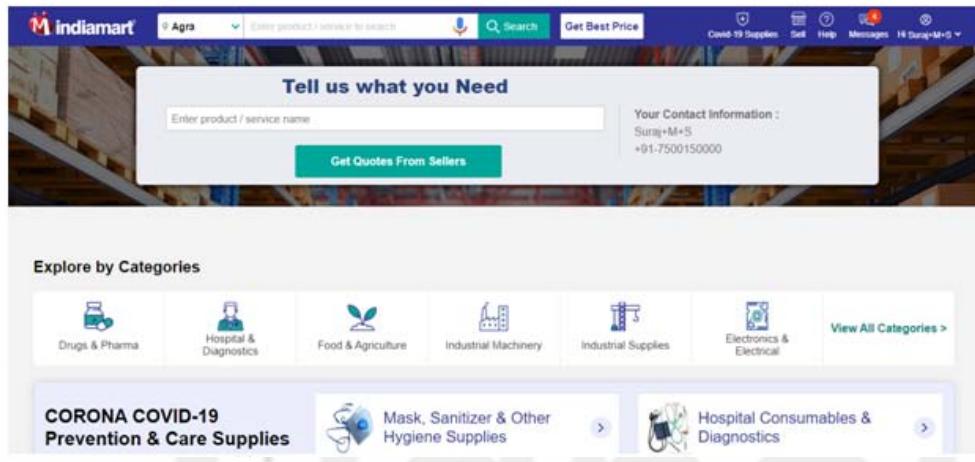


Fig 13.7: IndiaMART

- 5. Bookmyshow.com:** BookMyShow is the leading show ticketing portal and retailer in India. Bookmyshow is operated by Bigtree Entertainment Private Limited. Bigtree Entertainment Pvt Ltd. was founded in 1999 by Ashish Hemrajani. In 2007, sensing growth of multiplexes and the increased popularity of plastic money, Ashish launched BookMyShow. Bookmyshow instantly became a brand and was a quick success taking the market by storm, bringing Cinema biggies like PVR, INOX and Cinepolis on the portal. Again, to gain early mover advantage Bookmyshow mobile app was launched, foreseeing consumers favouring mobile over computer. Now Bookmyshow is the largest ticketing platform, offering tickets for movie, games, live events, plays and concerts. BookMyShow has expanded its operations to New Zealand, UAE, Indonesia and Sri Lanka.



Fig 13.8: Bookmyshow.com

- 6. Firstcry:** FirstCry is an Indian online store which deals in baby product retailing. Firstcry was founded by Supam Maheshwari in 2010, when he

realizes choices for baby products in India online were quite limited and he used to buy a lot of them for his son only on his business trips abroad. Thus, he discovered an opportunity for such platform and conceptualized FirstCry.com. He is also the founder of Xpressbees which today is one of the largest logistic companies in India. FirstCry acquired BabyOye in 2016, a brand that was owned by the Mahindra Group. The merged entity now does business under the name - FirstCry.com, a FirstCry Mahindra Venture. FirstCry also operates total of 380 offline stores and franchises stores. It is Asia's largest online shopping store for kids & baby products.

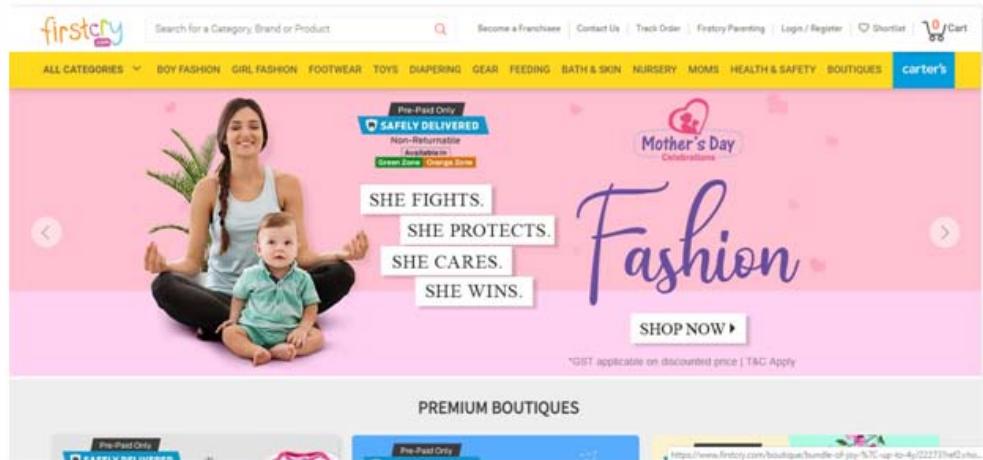


Fig 13.9: FirstCry

- Paytm Mall:** Paytm is a Noida based Indian e-commerce payment portal and financial technology company. One97 Communications parent company of Paytm was founded in August 2010 by Vijay Shekhar Sharma. In February 2017, Paytm launched its Paytm Mall app which uses B2C model which allows consumers to shop from registered sellers. To ensure customer trust and quality, product is passed from registered sellers to Paytm-certified warehouses and channels. Paytm Mall has set up various fulfilment centres across India and ensure fast deliveries partnered with various couriers. Paytm Mall app which uses B2C model which allows consumers to shop from registered sellers



Fig 13.10: Paytm Mall

- Alibaba Group:** Alibaba Group Holding Limited is a Chinese multinational technology company which exclusively deals in e-

commerce, retail, Internet, and technology. Jack Ma along with his team of 17 friends and students found Alibaba.com on 4th April 1999. The company operates largest B2B (Alibaba.com), C2C (Taobao), and B2C (Tmall) marketplaces in the world. Its online sales and profits surpassed all US retailers (including Walmart, Amazon, and eBay) combined since 2015. Just like Amazon, Alibaba also operates in different field as following –

- 1) E-Commerce and Retail Service Platforms
- 2) Internet Services
- 3) Cloud Computing and artificial intelligence technology
- 4) Financial technology and online payment platforms
- 5) Entertainment Services

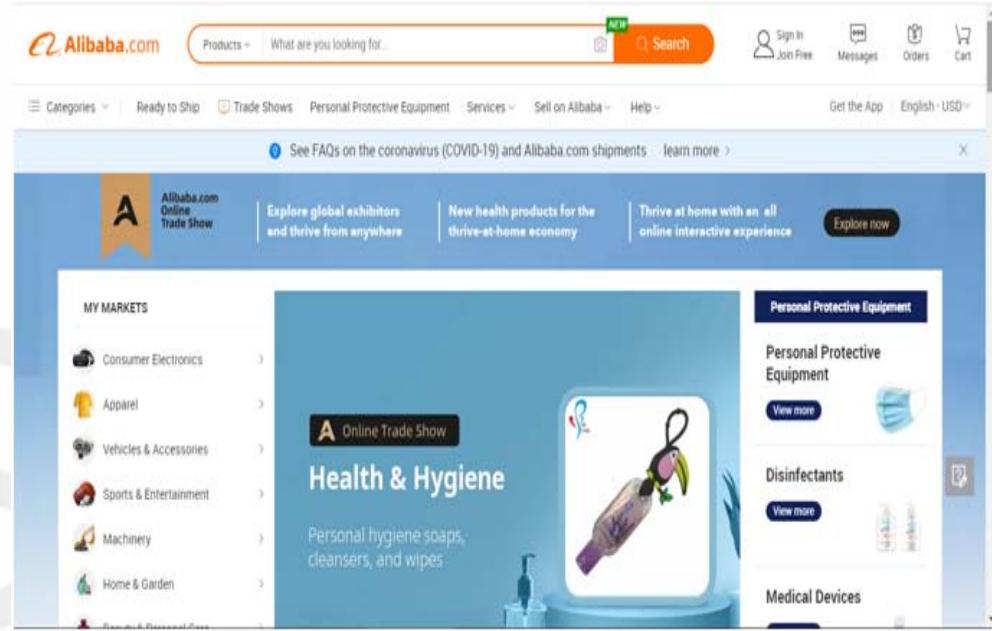


Fig 13.11: Alibaba

9. **E-bay:** E-bay is an American multinational e-commerce corporation operating in about 33 countries as of 2018 that facilitates C2C and B2C multi-billion-dollar sales through its website. It is based in San Jose, California and was founded by French-born Iranian-American computer programmer Pierre Omidyar in 1995. People buy and sell a variety of goods and services worldwide on E-Bay website which is an online auction and shopping website. E-bay is known for various acquisitions, some of major are Paypal, Craigslist, Skype, stubHub etc.

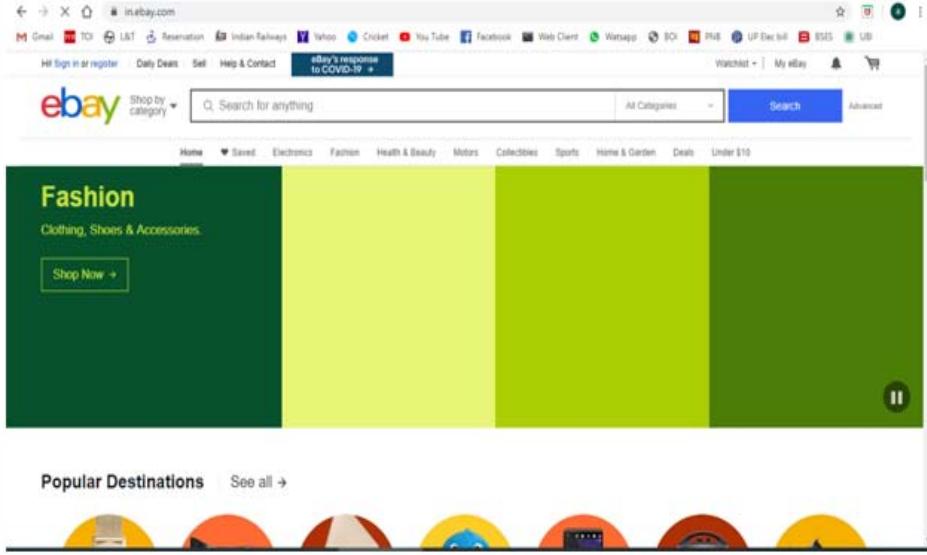


Fig 13.12: E-bay

Check Your Progress B:

1. Fill in the blanks:

- i) is an online auction and shopping website.
 - ii) Alibaba Group Holding Limited is a company which exclusively deals in e-commerce, retail, Internet, and technology.
 - iii) Paytm Mall has set up various fulfilment centres across India and ensure.....
 - iv) Amazon initially started as an online marketplace for but later diversified in selling electronics, software, video games, apparel, furniture, food, toys, and jewellery.
 - v) E-retail mix is defined as the different techniques and tools..... use to provide values for customers.
 - vi) The e-retailer can enhance..... using Customer Relationship Management (CRM).
2. What are the various ways of communication and customer relationships components of 7C's.
-
.....
.....
.....
.....

3. What are the 7C's of retail mix?
-
.....
.....
.....
.....

13.6 LET US SUM UP

Electronic retailing (E-tailing) is the sale of goods and services through the Internet. E-tailing can include business-to-business (B2B) and business-to-consumer (B2C) sales of products and services. It requires companies to tailor their business models to capture Internet sales, which can include building out distribution channels such as warehouses, Internet webpages, and product shipping centres. Notably, strong distribution channels are critical to electronic retailing as these are the avenues that move the product to the customer. Electronic retailing includes a broad range of companies and industries.

There are two types of e-tailing model pure play e-retailers and brick and click e-retailers. Pure play e-retailers only do the electronic transactions whereas, brick and click e-retailers do transactions in both online and offline mode. Various Advantages of E-tailing for retailers are location utility, less expensive, high Reach, 24*7 business, feedback. Disadvantages of E-tailing for retailers are lack of infrastructure, lack of technological expertise, complex logistic management, customers' expectations, lack of personal touch, high competition etc. Advantages of e-tailing for buyers are time utility, place utility, convenience utility and option utility. Disadvantages of E-tailing for buyers are customers may be uncertain regarding the quality of the products and services offered online, fear regarding online fraud and loss of money, every time not every product is available, lack of technological know-how etc.

E-tailing has two types of business models: Inventory based and marketplace based model respectively. Inventory based model includes the e-tailing activities where inventory of products and services is owned by e-tailers and it is directly sold to customers, and Marketplace based model provides a platform where buyers and sellers do the transactions in efficient, transparent and trusted environment. Here, buyers can compare the prices and accordingly place the orders to the authorized sellers on the website.

E-retail mix is defined as the different techniques and tools e-retailers use to provide values for customers. In 1990 Lauterborn proposed 4 Cs namely Convenience for the customer; Customer value and benefits; Cost to the customer; and Communication. However, with paradigm shift, more Cs added in the list i.e., Customer relationships; Computing and category management issues; Customer franchise and Customer care and service. Customer relationship is emphasis on long-term relationship with consumers and follows continuous interaction with them. Therefore, customer relationship merged with communication and finally there are 7 Cs.

In India, e tailing has substantially grown and still penetrating in the market owing to internet accessibility and smart phone availability. In addition, e-banking services and digital wallets have fuelled the e-tailing trends in India. As per the IBEF 2018 report, India will reach to US \$ 200 billion market in 2034 which is more than USA's market. Hence, e-retailers are strategizing the approaches to gain the Indian market by Omni-channels method, celebrity endorsement, and social media marketing and digital influencers.

13.7 KEY WORDS

Brick and click (Click-and-mortar) e-retailers- Retailers who do both online and offline transactions i.e., through internet and physical outlets. For example, Dell.

E-tailers: E-tailers are simply retailers who use the internet to sell their goods/services to their customers, rather than actual stores.

E-tailing: E-tailing also known as electronic retailing is the selling of retail goods on the Internet. It is synonymous with business-to-consumer (B2C) transactions.

Pure Play (Virtual) e-retailers- Retailers that only do the electronic transactions and do not have any physical outlet for the customers. For example- Amazon & Flipkart.

Retailers: Retailer is known as any person or business that sells goods. They don't manufacture their own items typically. They purchase goods from a manufacturer or a wholesaler and sell these goods to consumers in small quantities.

13.8 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress B

1. Fill in the blanks

- i) E-bay
- ii) Chinese multinational technology
- iii) fast deliveries partnered with various couriers.
- iv) books
- v) e-retailers
- vi) product value

13.9 TERMINAL QUESTIONS

1. What is E-tailing? Explain its advantages for retailers as well as buyers.
2. State the disadvantages of E-tailing for the retailers and buyers respectively.
3. Give the brief of E-tailing trends in India.
4. Explain the E-tailing models.
5. Explain the 7C's of retail mix.
6. Brief on the E-tailing key players in India.



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 14 E-SERVICES

Structure

- 14.0 Objectives
 - 14.1 Introduction
 - 14.2 Meaning of E-Services
 - 14.3 Benefits of E-Services
 - 14.4 FinTech
 - 14.4.1 Technologies used by FinTech
 - 14.4.2 Increased FinTech product offerings
 - 14.5 eFinancial Services
 - 14.6 eTravel Services
 - 14.6.1 Services offered under etravel
 - 14.7 eAuction Services
 - 14.7.1 Examples of eAuction Services
 - 14.8 eLearning
 - 14.9 Virtual Communities and Web Portals
 - 14.10 Online Learning
 - 14.11 ePublishing Services
 - 14.11.1 Online Publishing Strategies
 - 14.11.2 Online Publishing Approaches
 - 14.11.3 Copyright Issues
 - 14.12 Online Entertainment
 - 14.12.1 TV Online
 - 14.12.2 Book
 - 14.12.3 Radio
 - 14.12.4 OTT
 - 14.13 Let Us Sum Up
 - 14.14 Key words
 - 14.15 Terminal Questions
-

14.0 OBJECTIVES

After studying this unit, you should be able to:

- understand the concept of E-services and their various benefits;
- know about FinTech and various technologies used by it;
- describe the significance of internet in financial services;

- describe the significant patterns in the online travel administrations industry today;
- explain the significance of internet in auction services;
- highlight the aid of internet in learning;
- explain the significance of internet in publishing services; and
- describe the role of the internet in the entertainment industry.

14.1 INTRODUCTION

With the expanding demand of web-based business, more organizations are currently searching for better ways and means to upgrade their reasonable worth. Accordingly the electronic service industry is also growing. The new type of online business website architecture is moving towards the digitalization of numerous enterprises and the business association is furthermore realizing on their business engagements through it.

The time have gone when expansion and implementation required hundreds of years for execution, with introduction of technology and communication, there are a lot of alternatives for promotion, in reality, even a single individual can run an organization with simply a limited resources. The service industries (more formally termed as tertiary sector of industry' by economists) engross the provision of services to businesses as well as final consumers. Such services take account of accounting, tradesman ship (like mechanic or plumber services), computer services, restaurants, tourism, etc. Thus, service industries comprise a lot of other areas such as banking, communications, wholesale and retail trade, all professional services such as engineering, computer software development, and medicine, non-profits economic activities, all consumer services, and all government services, including defence and administration of justice etc.. This unit discusses in detail about various E-services which in real sense plays a pivotal role in technological era.

14.2 MEANING OF E-SERVICES

E-service is also known as an online service refers to any information and service provided over the Internet. These services not only allow subscribers to communicate with each other, but they also provide unlimited access to information. These services may be free or paid. Thus, E-Service comprises of the online services available on the Internet, whereby a suitable transaction of buying and selling is achievable, as opposed to the long-established websites, whereby only explanatory information are available, and no online transaction is made possible. Thus, e-service may also include e-Commerce, although it may also include non-commercial services (online),

Online service delivery is an effective way to build close relationships with customers, partners, and the public while simultaneously cutting costs and reducing delays. Increasingly, organizations across a number of sectors are

offering external-facing online services. The three main components of e-services are the service provider, service receiver and the channels of service delivery respectively.

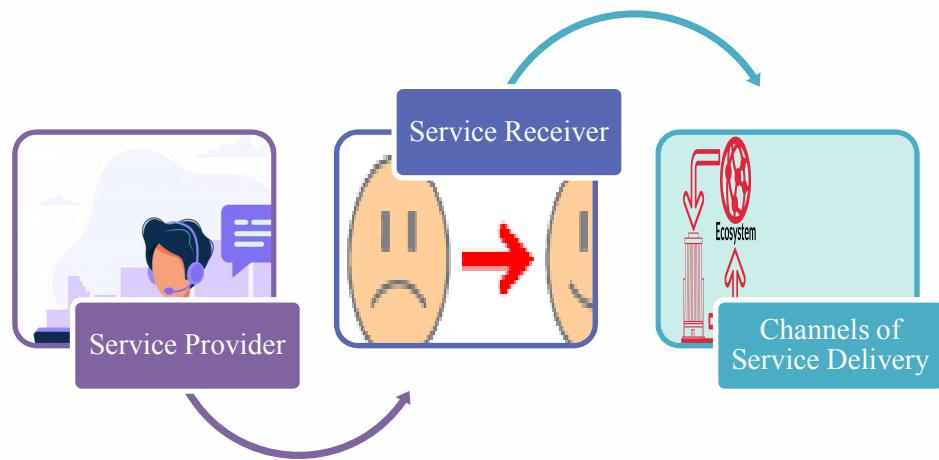


Fig 14.1: Components of E-services

For example, as concerned to public e-service, public agencies are the service provider and citizens as well as businesses are the service receiver. The channel of service delivery is the third requirement of e-service. Internet is the foremost channel of e-service delivery whereas other classic channels (e.g. telephone, call centre, public kiosk, mobile phone, television) are also well thought-out. There are various kinds of E-services such as;

- **Bookings systems:** Bookings for restaurants or reservations for a hotel can be managed online
- **Training courses:** Courses for training companies can be offered online etc.
- **Electronic governance or E-governance:** The four types of e-government services are Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), and Government-to-Government (G2G). Thus, Electronic governance or e-governance is the application of IT for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems between governments to citizen (G2C), government-to-business (G2B), government-to-government (G2G), government-to-employees.

14.3 BENEFITS OF E-SERVICES

There are assured benefits of using online services and these services which can give organisation an edge in making available numerous benefits both tangible and intangible in nature.



Source: Indian Government Portal GOV.in

Fig 14.2: State Portal of Assam

Figure 14.2 is the State Portal of Assam, developed with an objective to enable a single window access to information and services being provided by the various Indian Government entities. This Portal is designed and developed by National Informatics Centre (NIC), Ministry of Electronics & Information Technology, Government of India. We can easily list a number of benefits e-services can provide to vendors and consumers and could be fruitful in both the aspects such as;

- Accessing a greater customer base
- Accessing a greater customer base.
- Alternative communication channel to customers
- Alternative communication channel to customers
- Broadening market reach
- Broadening market reach.
- Cost savings.
- Enhancing perceived company image
- Enhancing transparency
- E-services can provide flexibility to Save your changes and return later to complete your submission.
- Faster delivery of products.
- Gaining competitive advantages
- Global access, 24 hours a day, 7 days a week.
- Improved client service through greater flexibility.
- Increased professionalism.
- Increasing services to customers
- Less paper waste.
- Lowering of entry barrier to new markets and cost of acquiring new customers
- Lowering of entry barrier to new markets and cost of acquiring new customers.

- Online Services mean you complete the forms electronically, giving you more flexibility and control.
 - Online Services or e-services are secure and convenient.
 - Opportunities to manage your business from anywhere in the world.
 - Potential for increasing Customer knowledge
 - You can share your Username and Password with your trustees
 - Independent Examiner or someone else who makes changes or submit the returns on your behalf.
-

14.4 FINTECH

Finance is seen as one of the industry's most vulnerable to disruption because financial services, are much like publishing, which are made of information rather than concrete goods.

FINTECH is a hybrid of the terms "finance" and "technology" and refers to any business that uses technology to enhance or automate financial services and processes. This is a broad and rapidly growing industry serving both consumers and businesses. Financial technology is the technology and innovation that aims to compete with traditional financial methods in the delivery of financial services. It is an emerging industry that uses technology to improve activities in finance. The tools and applications of FinTech affect almost every person who wants to make financial transactions. With the use of these services, consumers find easy-to-use peer-to-peer (P2P) and digital payment solutions to transfer money across regional and national borders.

The FinTech applications for internet business will permit retailers to catch a major portion of FinTech items deals. Expectations are that by 2040, practically all retail buys (95%) will be made on the web. On the off chance that these forecasts materialize, the worldwide retail web-based business and it will grow immensely. A major piece of the advantages of internet business for retailers will come from the online deals and acquisition of web-based business monetary administrations. It is an emerging industry that uses technology to improve activities in finance. The use of smartphone for mobile banking, investing, borrowing services, and crypto currency are examples of technologies aiming to make financial services more accessible to the general public.

14.4.1 Technologies Used By FinTech

Within the financial services industry, some of the used technologies include artificial intelligence (AI), big data, robotic process automation (RPA), and blockchain. A brief about all of these technologies in FinTech is explained below:

1. **Artificial Intelligence:** Artificial Intelligence is a general term for many different technologies. In terms of the "FinTech" industry, AI is used in various forms. AI algorithms can be used to predict changes in the stock market and give insight into the economy. AI is

used to provide insight on customer spending habits and allows financial institutions to better understand their clients.



Fig 14.3: Artificial Intelligence

2. **Chatbots:** A chatbot is a software application used to conduct an on-line chat conversation via text or text-to-speech, in place of providing direct contact with a live human agent. A chatbot is a type of software that can automate conversations and interact with people through messaging platforms. Chatbots are another AI-driven tool that banks and FinTech industries are using these days to help with customer service.



Fig 14.4: Chatbots

Deploying a chatbot saves time, money and resources. Improve Customer experience by providing faster resolution and better customer service. Thus also helps considerably in reducing operational cost.

3. **Big Data:** Big Data is another technology that financial institutions can utilize. In the finance sector, big data can be used to predict client investments and market changes and create new strategies and portfolios.

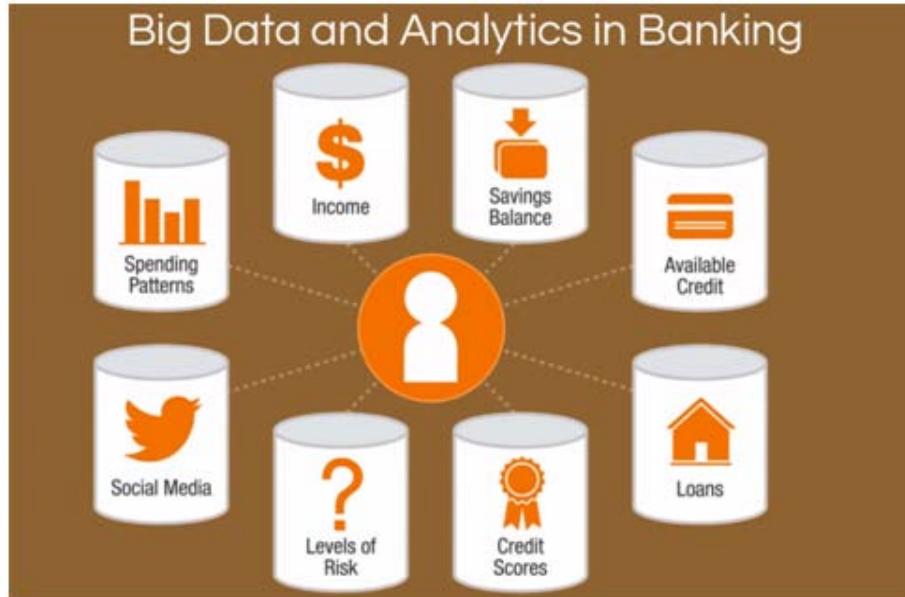


Fig 14.5: Big Data Analytics in Banking

Big Data can be used to analyze customer spending habits and therefore improve fraud detection. Big Data helps banks create segmented marketing strategies and can be used to optimize the operations of a company.

4. **Robotic Process Automation:** Robotic Process Automation is an artificial intelligence technology that focuses on automating specific repetitive tasks. In terms of FinTech, RPA is used to perform manual tasks that often are repetitive and completed daily. RPA helps to process financial information such as accounts payable and receivable more efficiently than the manual process and often more accurately. RPA can be used to increase the productivity of the financial company.
5. **Blockchain:** Blockchain is another financial technology that is being used in the industry. Out of all the "FinTech" technologies, blockchain was developed for the purposes of finance. The main feature of Blockchain in financial services is decentralization where it is not required to trust a third party to execute transactions. Though blockchain is still an emerging technology, many companies recognize the impact that it will have and are investing accordingly. In a nutshell, FinTech is the root of innovation operating at the intersection of financial services and technology.

Other forms of FinTech technologies act to supplement and enhance existing financial services. These include services such as transferring funds between banks by companies such as Plaid (company) and augmenting payroll services for consumers by companies such as Clair.

14.4.2 Increased FinTech Product Offerings

One incredible utilization of online business is to offer monetary types of assistance that broaden the things offered by banks. FinTech organizations may offer normal financial administrations in addition to different administrations, for example, exchanging unfamiliar money trade (Forex),

ventures, and protection. This is only the beginnings of a significant change brought about by the effective use of online business on banking and account. Here are some alternate ways that FinTech and web-based business influence one another:

1. **Advanced currency and crypto currency:** Actual money is being resigned in numerous countries to be supplanted by computerized adaptations of cash. This may move to digital money at last for its additional security assurances and handiness.
2. **Lasting digital archive records:** Blockchain innovation, which gets from cryptographic money applications, is currently used to make lasting encoded records of monetary exchanges that are public. There will be no requirement for people to keep any records/receipts when they can get to these perpetual records on the web. The utilization of blockchain innovation can decrease misrepresentation.
3. **Man-made brainpower and Big data mining:** Man-made brainpower (AI) is as of now being applied to examine Big Data and search for designs. Online retailers can lead to cross-reference buying movement with other Big Data measurements to foresee practices. Additionally, extortion can likewise be diminished by AI mining of Big Data to acquire bits of knowledge about examples of criminal conduct to help forestall it.
4. **Shared transactions:** Shared frameworks have just advanced that intermediate the customary FinTech structures. Models are distributed loaning, crowd funding, and available to be purchased by-proprietor (FSBO) land exchanges. At the point when an immediate, individual to-individual, association is hardly made there is no requirement for middle people.
5. **Versatility:** Most online buyers routinely utilize a cell phone for web-based business. Entrepreneurs can utilize a cell phone for bank card buys with the assistance of a straightforward connection that is utilized to peruse a bank card. The framework sends the exchange over the portable organization for approval. This administration is helpful, the exchange charges are exceptionally serious, and there are no month to month expenses. It is anything but difficult to pursue this kind of administration for those with a dealer account on PayPal and other monetary frameworks.
6. **Personalization:** Utilizing AI chatbots for client assistance and complex information examination, by applying AI calculations to Big Data, it is conceivable to customize each client's experience. Additionally A1 based frameworks find out the long run individual requirements. This makes it simpler to have the option to more readily address these requirements later on and envision an individual's interests. The area of monetary assistance and Fin Tech items are converging with online business. The conventional actual limits of physical retail locations have vanished on the web. On the web, it is similarly as simple to purchase protection from a significant retail location all things considered from a protection

organization. Utilizing AI for client assistance replaces the requirement for an enormous human staff of trained professionals. The improvement in advanced preparing of complex exchanges utilizing blockchain innovation implies that a lot more things will be sold by online retailers, including things like homes and monetary items.

14.5 eFINANCIAL SERVICES

Financial services refer to economic services provided by various financial institutions that deal with the management of money. It is an intangible product of financial markets like loans, insurance, stocks, credit card, etc. As we know that financial services are the economic services provided by the finance industry, which encompasses a broad range of businesses that manage money, including credit unions, banks, and credit-card companies. Thus, financial services are products of institutions such as banking firms, insurance companies, investment funds, credit unions, brokerage firms, and consumer finance companies.

With the advent of technology, the prefix ‘e’ has been added just to facilitate customer in a more agile way. It has been revolutionary in how internet business impacts banking. E-financial is a valuable online resource for finance, banking, accounting, and insurance domain. It is a key component of the financial system that facilitates financial transactions in an economy.

E-Financial services are an essential tool for economic growth as it brings together the one who needs funds and those who can supply funds. Financial services act as a barrier against risk arising from various unforeseen activities by insuring people against losses. These services are consumer-oriented as these are designed and provided in accordance with the needs of customers.



*Source:<https://financialservices.gov.in>

Fig 14.5: E-Financial Services

The mandate of the Department of Financial Services covers the functioning of Banks, Financial Institutions, Insurance Companies and the National Pension System. The Department is headed by the Secretary (FS) who is

assisted by three Additional Secretaries (AS), seven Joint Secretaries (JS), one Economic Advisers (EA) and a Deputy Director General (DDG).

14.6 eTRAVEL SERVICES

With the growing number of internet and smartphone users, the industry has progressed, and like any other online business it is shifting its focus to mobile. Web based business has changed the entire idea of movement and the travel industry. An e-travel is in a layman term is an action that covers the complete travel business world on the Internet (mainly travel websites). The use of these travel websites have immensely changed the way people used to plan their travel.

Table 14.1: FAQ related to E-travel Portal

How do E-travel companies provide hotel bookings? Do they work in real time? Do they customize software for every hotel?

This e-travelling aggregator is also known as an OTA (online travel Agent). They invest a lot of money in keeping their search in Google or other search engine at highest (Big SEO type). As far as the hotelier which make their accounts on to this OTA's (profile), where they can add their images and data such rooms and the rates for the rooms. There are two system working on their end

-Front end (where any customer can Book rooms)

-Extra net (where the hotel owner can see the bookings which made by customer on the front).

Now as soon as customer made a booking then it will remove 1 room from the extra net and only shows the remaining room at the front end, so when all rooms are sold it will not show at the front. This works in real time and can customise discounts/packages (Like complimentary breakfast or pickup - drop off facility)

Over all e-Travel services have changed lot many things and bring about some very important changes. It also signifies the following:

- Penetration of credit card usage on mobile phone is higher than on desktop.
- Initial discovery rate is higher on mobile as mobile is the first point of contact for the internet for a lot of people.
- Mobile usage is relatively higher on weekends.
- Other major trend of online travel industry is the interest of consumers in deals and packages.

Travel organizations would now be able to contact their worldwide crowd settling down anyplace on the planet and effectively counts their evaluating with rivals to empower them to offer their own clients the most ideal alternatives.

14.6.1 Services Offered Under E-Travel

eTravel offers multiple services like cruise, hotels, flights, cars making it an ideal system for all booking requirements. eTravel offers user friendly web system to book travel or reservations with ease

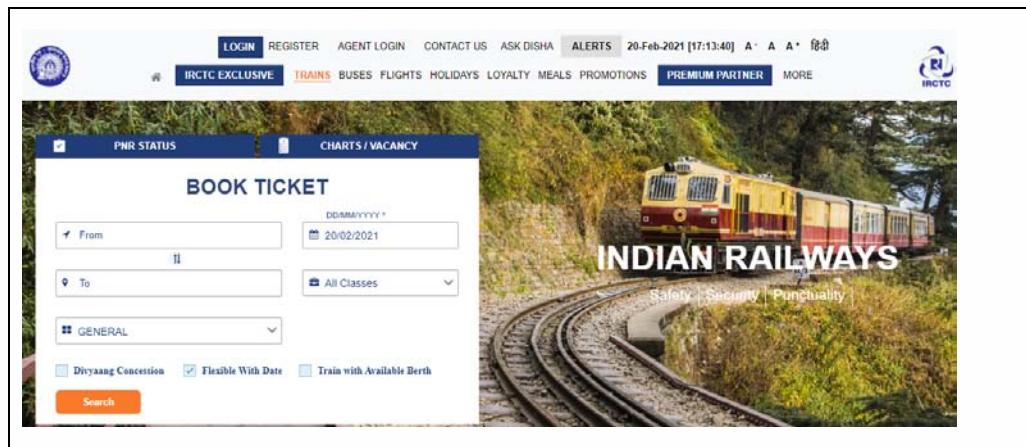
Below are some of the advantages of the online services in travel industry:

1. **Online booking:** Clients are not any more needed to visit travel agents. The entire booking framework is online with a doable instalment framework. Each framework works independently however the mix of this set-up is assisting with building and increment business.
2. **Overseeing recessions:** The web-based business industry has incredibly influenced downturns. A downturn is the time of misfortune that goes on for about half year. Online business innovation has presented the fast recuperation of downturn through its optimal answers for the issues that emerge.
3. **Computerization and networking:** GPS is perhaps the best innovation that encourages you in the business of movement and the travel industry. On the off chance that you'll look into any of the transportation administrations, internet business is the one thing that is assisting you with associating and offer the best administrations to the customers.
4. **Extra global market:** Web based business innovation gives you better skill about the extra market. The business movement is not restricted to a nation or a city it is all around the world focusing on its clients. Individuals would now be able to book their excursions to the extraordinary objections from anyplace, for example, their office or even the solace of their own homes.
5. **Ease of accessibility:** The technique cycles of business are currently as simple as connecting with the market. The travel planners would now be able to become more acquainted with the contenders and plan their business appropriately. Aside from the mounds of data, it gives to the simplicity of availability to the clients and contender conduct. It makes it all simple for individuals to interface and become together.

Table 14.4: Case Study of IRCTC



Indian Railway Catering and Tourism Corporation (IRCTC) are an Indian public sector undertaking that provides ticketing, catering, and tourism services to the Indian Railways. It was initially wholly owned by the Government of India, as a subsidiary of the Indian Railways, and operated under the administrative control of the Ministry of Railways, but now the company has been listed on the National Stock Exchange since 2019, with the Government continuing to hold majority ownership. IRCTC website is amongst the most viewed web-sites in the world, rankings under 750 top sites worldwide and under 50 top sites in India. On an average, 4.15 lakhs tickets are booked daily.



14.7 e-AUCTION SERVICES

eAuctions are online, real-time dynamic negotiations between a buying company and a number of pre-qualified suppliers who compete directly against each other to win the right to supply the specific goods or services that have clearly defined specifications for design, quality, quantity, delivery and related terms and conditions.

Utilizing eAuctions enable streamlining procurement process, resulting in increased savings that reflects directly on bottom-line. So, this not only saves money on products and services but also saves valuable time to use on creating more value for instance, sourcing new suppliers. The advantages of using eAuctions are manifold. Some of its advantages are, Time Savings, Cost Savings, Achieving a Uniform Buying and Negotiation Process, Greater Market Transparency etc. There are two types of eAuctions:

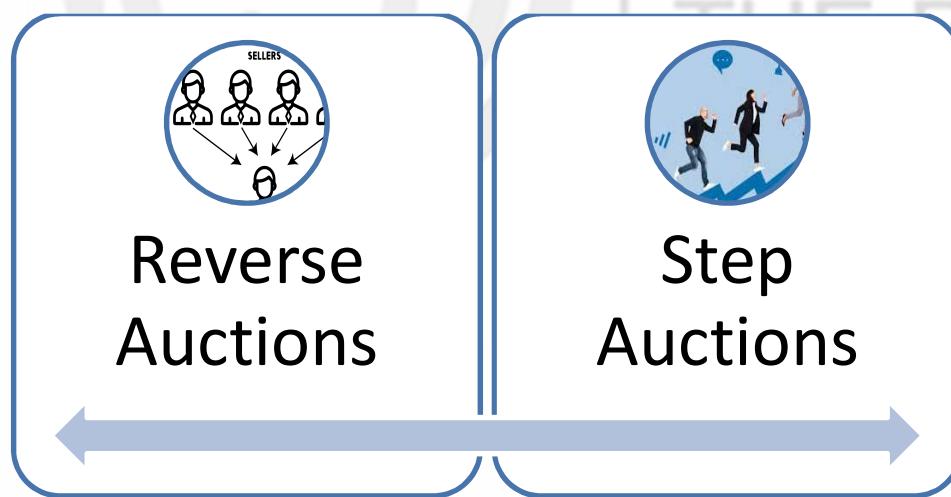


Fig 14.6: Reverse Auction v/s Step Auction

- **Reverse auctions:** A reverse auction is a type of auction in which the traditional roles of buyer and seller are reversed. Thus, there is one buyer and many potential sellers. In an ordinary auction, buyers compete to obtain goods or services by offering increasingly higher prices
- **Step Auctions:** In a step auctions, savings are generated because suppliers are unaware about their competitiveness compared to the other suppliers. In this format, suppliers have no transparency regarding their

position, how many suppliers are participating in the auction or the other suppliers' prices. The supplier can only see when their bid has been accepted or rejected. For this reason, a step auction can take place with only one supplier.

14.7.1 Examples of E-Auctions Services

- **General consumer auctions:** The best purchaser sell off Web destinations is eBay and the most well-known arrangement utilized is a modernized form of the English sale. Note that in the eBay English sale merchants are permitted to set a save cost. In this kind of sale, bidders are recorded, yet the offer sums are not unveiled until the sale is finished. This is a slight difference from the in-person English sale, but since eBay consistently shows a ceaselessly refreshed high offer sum, a bidder who screens the sale can see the offering design as it happens. The fundamental contrast between eBay and a live English sale is that bidders don't have the foggiest idea who to put which offer until the bartering is finished. The eBay English sale additionally permits merchants to indicate that a closeout be made private. In an eBay private sale, the site never reveals bidders' characters and the costs they offer. At the finish of the closeout, eBay informs just the dealer and the most noteworthy bidder. Another closeout type offered by eBay is an expanding value design for different thing barterers that eBay calls a Dutch sale. This configuration is certifiably not a genuine Dutch closeout; however, is rather a Yankee sale.

Table 14.7: eBay sell off, bidders Case Study

eBay started out as Auction Web, an online auction portal that allowed interpersonal transactions. It was a first of its kind – a platform business model that generated revenue by drawing a transaction fee from the people and businesses that used the website for selling/buying products and services.



Today, eBay is a multibillion-dollar e-commerce platform linking millions of buyers and sellers across the globe. It allows consumer to consumer and business to consumer transactions. The platform is free of charge for buyers. The sellers receive a pre-determined number of free listings and are charged a fee for subsequent listings. eBay also generates revenue from the commission gained from product sales.

eBay currently operates across 30 different countries, serving as a traditional online shopping website (ebay.com) with thousands of different products in addition to offering services like online auction, event ticket trading (stubhub.com) and online classified ads. In one or the other sort of eBay sell off, bidders should continually screen the offering movement. All eBay barterers have a base offered increase, the sum by which one offer should surpass the past offer, which is around 3 percent of the offer sum. To make offering simpler, eBay permits bidders to make an intermediary offer. In an intermediary offer, the bidder

determines a most extreme offer. In the event that that most extreme offer surpasses the current offer, the eBay site naturally enters an offer that is one least offer higher than the current offer. As new bidders enter the closeout, the eBay site programming consistently enters higher offers for all bidders who put intermediary offers. Despite the fact that this element is intended to cause offering to require less bidder consideration, if various bidders enter intermediary offers on one thing, the offering rises quickly to the most elevated intermediary offer advertised. This quick ascent in the current offer frequently happens in the end hours of an eBay closeout.

- **Specialty Consumer Auctions:** There are three broad categories of auction websites, general consumer auctions, speciality consumer auctions eBay in the overall customer sell off market, various firms have chosen to distinguish unique premium market targets and make particular Web closeout destinations that address the issues of those market sections. A few early Web closeout locales began by including innovation things, for example, PCs, PC parts, photographic hardware, and shopper gadgets.
- **Consumer Reverse Auctions and Group Purchasing Sites:** Another sort of business made conceivable by the Internet is the gathering buying webpage, which is like a customer turn around sell off. On a gathering buying site, the dealer posts a product with a cost. As individual purchasers enter offers on a thing (these offers are arrangements to get one unit of that product, however no cost is indicated), the site can arrange a superior cost with the product's supplier. The posted cost eventually diminishes as the quantity of offers increments, however just if the quantity of offers increments. Consequently, a gathering buying site develops various purchasers who will constrain the vender to decrease its cost. The impact is actually similar to the one accomplished by a buyer turn around sell off. The sorts of items that are ideal for bunch buying destinations are marked items with grounded notoriety. This permits purchasers to feel certain that they are getting a decent deal and are not compromising cost for diminished quality. The items ought to likewise have a high-worth to-measure proportion and ought not to be transitory.
- **Business-to-Business Auctions:** There are B2B auctions which are between business to business. Large Organisation regularly trans act unused or over stocked material have liquidation experts who discover purchasers for these unusable stock things. More modest organizations regularly offer their unusable and overabundance stock to liquidation merchants, which are firms that discover purchasers for these things. Online sales are the consistent expansion of these stock liquidation exercises to another and more productive channel, the Internet.

Two of the three arising business-to-business Web closeout models are immediate relatives of these two customary techniques for dealing with abundance stock. In the huge organization model, the business makes its own closeout site that sells overabundance stock. In the little organization model, an outsider Web closeout website replaces the liquidation representative and sales abundance stock recorded on the webpage by various more modest merchants. The third business-to-business Web closeout model takes after purchaser online sell-offs. In

this model, another business element enters a market that needed effectiveness and makes a site at which purchasers and dealers who have not verifiably worked with one another can take an interest in sales. An elective execution of this model happens when a Web sell off replaces a current deals channel.

- **Business-to-Business Reverse Auctions:** In the past years, glass and building materials maker Owens Corning held in excess of 200 converse sales for an assortment of things including synthetic compounds (direct materials), transports (fixed resources), and line fittings (MRO). Owens Corning even held an opposite sale to purchase filtered water. Requesting that its providers offer has decreased the expense of those things by a normal of 10%. Since Owens Corning purchases billions of dollars' worth of materials, fixed resources, and MRO things every year, the potential for cost reserve funds is huge. Both the U.S. Naval force and the government's General Services Administration are exploring different avenues regarding reverse closeouts to procure a little piece of the billions of dollars' worth of materials and supplies they buy every year. Organizations that utilization switch barters incorporate Agilent, Bank One, Bechtel, Boeing, Raytheon, and Sony.

Not all organizations are excited about opposite sell-offs. Some buying heads contend that converse sell-offs cause providers to contend on cost alone, which can lead providers to compromise on quality or miss booked conveyance dates. Others contend that converse closeouts can be valuable for nonstrategic ware things with set up quality guidelines.

14.8 E-LEARNING

All of us have access to the internet and we use it for many different things like researching for some information for school and college projects, downloading music, pictures, wallpapers, emails, instant messaging, chats, and many other things.

One can educate oneself in the comfort of their own home and get a degree through the internet now. With the latest technology, even the impossible seems possible now.

E-Learning, or electronic learning, is the delivery of learning and training through digital resources. Although eLearning is based on formalized learning, it is provided through electronic devices such as computers, tablets and even cellular phones that are connected to the internet.

Benefits of eLearning

E-learning saves time and money. With online learning, learners can access content anywhere and anytime. E-learning is also cost-effective; companies save a substantial amount on the travel and accommodation costs of both learners and instructors, as well as the venue and materials.

SWAYAM (meaning 'Self') is a Sanskrit acronym that stands for "Study Webs of Active-Learning for Young Aspiring Minds" is an Indian Massive open **online course** (MOOC) platform. The platform offers free access to everyone and hosts **courses** from **class 9** till post-graduation. SWAYAM is a programme initiated by Government of India and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.



Courses delivered through SWAYAM are available free of cost to the learners, however learners wanting a SWAYAM certificate should register for the final proctored exams that come at a fee and attend in-person at designated centres on specified dates.



In order to ensure that best quality content is produced and delivered, nine National Coordinators have been appointed. They are:

- AICTE (All India Council for Technical Education) for self-paced and international courses
- NPTEL (National Programme on Technology Enhanced Learning) for Engineering
- UGC (University Grants Commission) for non technical post-graduation education
- CEC (Consortium for Educational Communication) for under-graduate education
- NCERT (National Council of Educational Research and Training) for school education
- NIOS (National Institute of Open Schooling) for school education
- IGNOU (Indira Gandhi National Open University) for out-of-school students
- IIMB (Indian Institute of Management, Bangalore) for management studies
- NITTTR (National Institute of Technical Teachers Training and Research) for Teacher Training programme

Online Portal and Application

The screenshot shows the SWAYAM website homepage. At the top, there's a navigation bar with links for 'About Swayam', 'All Courses', 'National Coordinators', and 'Local Chapters'. Below the navigation is a search bar labeled 'Search Catalog...' and a 'SIGN-IN / REGISTER' button. The main header features the text 'For Administrators' and 'Interface with SWAYAM as a Local Chapter'. To the right of the text is a photograph of a man wearing glasses and a white shirt, sitting at a desk with a laptop. Below the main header is a brown banner containing four yellow rectangular boxes with text: 'Jan 2021 Semester: 774 courses open for enrollment.', 'SWAYAM Courses in Regional languages', 'Jan 2021 Semester: Click to access NPTEL Exam Registration', and 'Let COVID-19 not Stop your Learning. Continue with SWAYAM'.

Source: <https://swayam.gov.in> [SWAYAM]

Check Your Progress A:

1. What are online services?

.....
.....
.....
.....
.....

2. Differentiate between speciality consumer auctions and business to business auctions.

.....
.....
.....
.....
.....

3. Explain the ease of accessibility in online travel services.

.....
.....
.....
.....
.....

4. How is Artificial intelligence leading to personalization in online banking services?

.....
.....
.....
.....
.....

14.10 ONLINE LEARNING

Online or web-based learning is schooling that happens over the Internet. It is frequently referred to as "e-learning" among different terms. We can say that, internet learning is only one kind of "distance learning" - the umbrella term for any discovering that happens across distance and not in a conventional mode of teaching learning. Distance learning has a long history and there are a few kinds accessible today, such as;

- **Correspondence Courses:** These are led through standard mail with little collaboration.
- **Tele courses:** Substance in tele courses is conveyed through radio or transmission.
- **Compact disc ROM Courses:** Under this preloaded study content is offered via compact discs.
- **Web based Learning:** These are offered via medium of internet.
- **Portable Learning:** This is offered by gadgets, for example, phones, PDAs and advanced sound players (iPods, MP3 players).

Internet learning acts as a catalyst to educate and learn. There is a move away from top-down addressing and inactive understudies to a more intuitive, community-oriented methodology in which understudies and teacher co-make the learning cycle. The Instructor's job is transforming from the "sage on the stage" to "the guide as an afterthought."

Some of the fundamental focal points of online learning includes:

- **Convenience:** Online learning provides all day, every day access from any online PC; obliges occupied timetables; no driving, no looking for stopping.
- **Enhanced Learning:** Research shows expanded profundity of comprehension and maintenance obviously content; more significant conversations; accentuation on composing aptitudes, innovation abilities, and fundamental abilities like time the executives, freedom, and self-control.
- **Levelling of the Playing Field:** Students can set aside more effort to think and reflect prior to imparting; bashful understudies will in general flourish on the web; secrecy of the online climate.
- **Interaction:** Increased understudy to-educator and understudy to-understudy collaboration and conversation; a more understudy focused learning climate; less uninvolved tuning in and more dynamic learning; a more prominent feeling of connectedness, cooperative energy.
- **Innovative Teaching:** Student-focused methodologies; expanded assortment and inventiveness of learning exercises; address diverse learning styles; changes and enhancements can mean on-ground courses too

- **Improved Administration:** Time to look at understudy work all the more altogether; capacity to archive and record online cooperations; capacity to oversee evaluating on the web.
- **Savings:** Accommodate more understudies; expanded understudy fulfilment = higher maintenance and less rehashes.
- **Maximize Physical Resources:** Lessen request on restricted grounds foundation; decline clog nearby and parking garages.
- **Outreach:** Give understudies choices; arrive at new understudy markets; appeal to current understudies subsequently expanding enrolments.

14.11 e-PUBLISHING SERVICES

At first, development in the internet distributing commercial center was driven by the capability of new intelligent innovations and applications. The guarantee of new intuitive distributing caught the creative mind of both substance suppliers and the general population. Nonetheless, from 1993 to 1995 a lot of internet distributing was repressed by an absence of business reason. Around then, the substance creation side of internet distributing was overwhelmed by techno-adroit people who were not competent at selling and who did not comprehend the matter of distributing. Also, there were distributing organizations simply needed to be on the web without understanding the cycles and irritations.

As the underlying rapture wore off, distributors understood that basically having a presence on the web did not ensure benefits. They found that offering energizing innovation without convincing substance is inadequate to catch piece of the overall industry. These organizations are discovering that the most ideal approach to catch buyers' consideration is to build up a plan of action that permits the organization to offer one of a kind and important data, programming, and administrations.

Online distributors are growing new plans of action to charge clients straightforwardly and persuade them that such charges are defended. As an ever-increasing number of firms start to offer online substance, they are being compelled to change in accordance with new client perspectives in regards to evaluating. Distributors presently money their organizations by giving publicists mass business sectors for conveying their message as a trade-off for huge publicizing expenses. General society has been prepared to feel that the news, data, and amusement they get ought to be financed or almost free and that promoters will cover the tab. This methodology may not be feasible in the online medium when mass business sectors are re-put by clients choosing their data and conveyance strategies.

The early internet distributing pioneers are attempting to achieve a troublesome accomplishment. Paper and magazine distributors, a portion of the first to have a special interest in the internet, are dabbling with new promoting models for their juvenile web locales. As a rule, standard publicists have been restless about siphoning cash into a medium with a

group of people whose size and propensities are almost difficult to sort out. Because of moderately low promotion incomes, none of the Web distributers have made money. While advertisement incomes are not verging on covering costs now, they could fill considerably in coming a long time as the traffic increments and brand names become set up. Brand improvement is significant on the grounds that each time a client sits before a web program; she needs to settle on a choice about where to go. The better the brand, the more probable it is to spring up in the shopper's brain

14.11.1 Online Publishing Strategies

Similarly, as with any new turn of events, there are by and large three systems for distributing organizations to consider:

- **Early Movers:** These are exceptionally talented free distributers with existing admittance to such key capacities as immediate advertising and request satisfaction. These distributers have the ability to get the most noteworthy advantages from new media as their expectations to absorb information are a lot more limited than others, and they as of now have a significant number of the essential assets close by.
- **Watchers:** These are enormous distributing organizations that utilize scale-touchy financial matters. They are probably not going to see internet distributing as an adequately appealing channel until costs fall and dispersion broadens. This class incorporates distributers of unbranded or less unmistakable substance who can't draw in an adequately huge beginning customer establishment, just as engaged distributers in classifications not handily appropriate for the online medium.
- **Analyzers:** These are most of distributers that face either engaging quality or potentially expertise challenges. Assembled here are numerous multi class and claim to fame distributers who are contending effectively in conventional business sectors, who are questionable who will win in the online commercial center, and who neither need nor need to settle on a decision now. Analyzers likewise incorporate marked general distributers with hearty customer establishments and appealing dissemination diverts effectively set up. For this gathering, the online medium gives off an impression of being another option.

As a rule, distributers are instructing themselves about the expected chances without subscribing to anybody position. Those with solid brand pictures and existing purchaser establishments may decide to post-pone section until they find reasonable specialist co-ops and wholesalers. Distributers, for example, the Wall Street Journal and New York Times are participating in focused tests and pilot projects pointed toward realizing what web based distributing has to bring to the table, building required abilities, and investigating the appeal of expected channels. These tests regularly incorporate an ability building program just as an early notice framework so an organization can rapidly distinguish and re-act to changes inside the business or economy.

Content, motivators, administration, quality, and cost won't be sufficient to contend in this new climate. Speed of conveyance, packaging of items, and variety of decision additionally become basic achievement factors. Distributors should enhance continually and challenge present ideas if this type of business is to turn out to be broadly acknowledged and famous. Winning in internet distributing will involve growing new aptitudes in regions, for example, customized promoting, request handling and satisfaction, and client care just as re-learning the major standards concerning why individuals buy in.

14.11.2 Online Publishing Approaches

There are many online publishing approaches as explained below:

1. **Content distributing approaches:** There are four types of content distributing approaches as explained following:
 - **The online chronicle approach:** This is new to the Web, yet is a sensible augmentation of the patterns in electronic conveyance in the course of recent years.
 - **The new medium methodology:** This is more dubious and harder to execute, yet additionally energizing.
 - **The distributing intermediation approach:** This is an online augmentation of the outsider distributor part disconnected.
 - **The dynamic and without a moment to spare methodology:** In this methodology, content is amassed continuously and communicated in the organization most appropriate to the client's preferences and inclinations.
2. **The Online Archive Approach:** The online chronicle approach (counting bibliographic information bases and full-text search/recovery administrations) claims to corporate distributors and, somewhat, business distributors, (for example, scholastic or diary distributors) who have a current computerized document that they need to convey over the Web just as on paper, CD-ROM, or other media.

An illustration of a bibliographic information base is MEDLINE, created by the National Library of Medicine (NLM), which obliges an expanding number of doctors who depend on online clinical information bases to stay up with the latest with the most recent turns of events and writing. The spread of PCs has empowered doctors to straightforwardly look through information bases utilized exclusively by bookkeepers previously. MEDLINE and other clinical information bases are accessible complimentary on the Internet.

3. **The New Medium Approach:** The new medium methodology (counting genuine - time news conveyance, customized news conveyance, and edutainment) expects to make new material for the Web-to regard the Web as its own medium, one meriting its own material. This methodology will have the most appeal to business print distributors, for

example, magazines, that see the Web as another option, not a substitution, for print distributions. For instance, Wired magazine sees practically nothing hybrid in substance between its magazine and its Hot Wired adventure. A few essayists may compose for both media, however separate substance streams will be produced for every medium.

This methodology right now makes them aware about the issues in view of mechanical constraints. For example, the arranging constraints of the Web are disappointing right now, yet with innovative progressions they will before long be failed to remember. The dissatisfactions are more than counterbalance the Web offers; its model is both telecom and discussion simultaneously. With web based distributing there might be a notable beginning stage, however with no controlling watchman; the ensuing worth added act of spontaneity from per users makes each online magazine a one-of-a-kind encounter.

Regardless of whether the innovation imperatives were survived, the assumptions for the Web are so not the same as print media that new substance, composed for a Web crowd, should be made. It rapidly becomes evident that under this model, the old standards don't work. The distributor surrenders its image name, however its scholarly substance, too-once the data is out there, it is no more, possessed. Confronted with that model, every one of a distributor can do is "be the first with the most fascinating stuff," a methodology that HotWired is taking in its endeavour to make a spot where per users can perceive what the world needs to state on a moment by minute premise.

4. **The Publishing Intermediation Approach:** The distributing intermediation approach (counting on the web indexes) misuses new help openings for go-betweens. For instance, in the developing business sector for instructive material, for example, course packs and other modified books, organizations offering material claimed by more than one distributor face the overwhelming assignment of getting authorizations. New associations that spend significant time in the administration of copyright leeway are arising as vital participants.

Online indexes are significant for a few reasons. Organizations and customers keen on directing electronic trade frequently battle to explore the Internet to make an electronic commercial center. Once on that rambling organization, they are experiencing difficulty finding different organizations, items, and administrations. The achievement of Yahoo's first sale of stock (IPO) underscores the significance of online indexes. Yippee (which represents Yet Another Hierarchical Officious Oracle) was made in 1994 by David Filo and Jerry Yang, two Stanford, University electrical designing PhD understudies who started DY assembling arrangements of their number one Web destinations. It proceeded to get perhaps the most well known methods for exploring around the Internet. Yippee is the primary spot a great many Internet clients go when they attempt to discover their way around the quickly developing Internet. At once, Yahoo was getting around 6 million guests for every day, which made it the second most dynamic Web webpage

close to Netscape's landing page. Unmistakably, there will be an interest for intermediation in light of the fact that there will always be a requirement for a decent catalogue to assist individuals with finding merchandise, administrations, and items. What's to come is splendid for the distributing delegates who offer simplicity of activity, speed, and point by point data.

5. **The Dynamic and Just-in-Time Publishing Approach:** Online substance is not, at this point static data. Substance would now be able to be made continuously and communicated on the fly in the configuration most appropriate to the client's area, tastes, and inclinations. All the more critically, the substance motor perceives rehash guests to a website and arranges the Web pages to coordinate the person's known inclinations. For instance, a distributor wanting to send a huge item index will presently don't need to creator and update every individual Web page. All things considered, the components of each page-text, designs, video, and sound-are put away independently in an information base and used to make individualized pages on the fly as every client peruses the site.

14.11.3 Copyright Issues

Another central point of interest in web based distributing identifies with computerized copyrights. Powerful mechanical assurance instruments are essential to guaranteeing the accessibility of value content on the web. Today, distributors, for example, Addison- - Wesley just offer inventories or test determinations of works accessible on the web. They don't and can't offer more in light of the fact that in a climate where the way of life and innovation give so little assurance to the privileges of content makers, there is too extraordinary a danger to their protected innovation. The Internet makes it amazingly simple to duplicate, retransmit, and change works without the authorization or the copyright holder. Additionally, the advanced world has no worldwide limits, and policing is unthinkable since the degrees of assurances and assets against encroachment differ broadly in nations across the globe, which makes the danger considerably more noteworthy.

14.12 ONLINE ENTERTAINMENT

Utilizing the Internet has just reformed business, banking, individual correspondences and shopping. The entertainment industry is also not an exception to it.

The Online entertainment basically includes getting music and movies over the Internet. This can be either watched or tunned in to programs as they occur (live streaming) or to keep it on your gadget to appreciate sometime in the not too distant future based on your very own preference (downloading). There are various types of online diversion are accessible which includes Online books (digital books), Online music (streaming or downloading from collections, playlists or radio broadcasts), Online TV and film seeing (streaming or downloading), Online games etc.

Any cutting-edge web empowered gadget ought to have the option to get to online diversion. A PC, or tablet may be favoured by some for getting a charge out of visual media as the screens are bigger yet most cell phones with great quality screens are completely competent too. Music can be played back on numerous gadgets and you can utilize the earphone attachment found on most electrical gadgets to connect speakers or individual earphones/headphones. Benefits of getting to diversion on the web are convenience - browsing a wide scope of effectively got to material, Cost - capitalizing on free substance and Timing - picking when and where you see or tune in etc. Below explained are the examples of online entertainment services:

14.12.1 TV Online

- Television administrations are accessible for most significant stations and there are a couple of various manners by which you can stream the substance. Watch recorded TV shows which are put away online after their unique transmission. Watch live TV which shows programs progressively (you need a TV permit for this) YouTube Massively famous for everything from music recordings, full TV projects and movies just as senseless clips. YouTube is free and perhaps the simplest real time feature to utilize. BBC iPlayer Streaming is getting progressively critical to the BBC and by utilizing their own iPlayer administration you can get to TV and radio yield that is both live and recently recorded. In the event that you stream any 'live' TV content you should have a TV permit despite the fact that in the event that you just utilize the administration for documented material (for example shows that have just been communicated) this doesn't make a difference. Comparative choices are accessible from other earthly TV channels like ITV, ITV Player, Channel 4: 4 On Demand, Channel 5: Demand 5 etc.
- **Film:** Those with memberships to administrations, for example, LoveFilm and Netflix can likewise get to a scope of movies on the web. Comparative administrations are likewise accessible to supporters of computerized TV bundles, (for example, Virgin Media or Sky) and permit clients to login to their record and view films on the web. Watch late deliveries and old movies online through streaming. A solid web association and a lot of information stipends will be expected to devour this measure of information. Most films require "buffering" to permit the substance to be seen and in the event that you are in a territory with restricted network, at that point this may be influenced Netflix Originally began as a DVD conveyance administration, Netflix currently offers an immense scope of movies, TV shows and a developing choice of unique substance all as 'on interest' streams. This is a paid for administration despite the fact that you might have the option to get a free one-month preliminary. Amazon Instant Video Formerly LoveFilm until February 2014, Amazon Instant Video offers a lease and purchase administration with admittance to in excess of 50,000 advanced motion pictures and TV scenes. A 30-day free preliminary can be accessible while Prime Instant Video offers a membership administration.

14.12.2 Book

Digital books can be gotten to online to give clients the opportunity to peruse from gadgets. Quest for well-known titles, new deliveries or old book. Enjoy a scope of free downloadable books with certain assistance (Kindle and so forth). Purchase new books to peruse on applications downloaded on your PC or explicit tablet devices. Download bought books to your tablet to appreciate progressing Google Play Many individuals have tablets or cell phones which utilize the Android working framework and Google Play is the authoritative source to download films, TV shows and significantly more. Windows Phone App Store This is intended for use with Windows Phone gadgets and furthermore offers admittance to an extraordinary scope of substance to download on the gadget.

14.12.3 Radio

Radio just as getting to music as individual records; you can likewise get to online radio broadcasts to appreciate later or old hits. Visit the site of the radio broadcast you need to tune in to listen to live transmissions to hear the most recent music, news and critique Listed to web recordings or meetings put away on the radio site BBC Radio Listen to shows from any of the BBC Radio channels, including live streaming and past shows. Web Radio a live streaming radio website that incorporates large numbers of the UK's driving stations, Internet Radio offers a support that can turn any PC, tablet or telephone into a radio. Various radio broadcasts can likewise be gotten to straightforwardly internet, including the accompanying: Heart FM Kerrang Capital FM Magic Kiss FM Absolute Radio.

14.12.4.1 OTT (Over-The-Top)

OTT also known as Over-The-Top platforms are the content providers growing exponentially as more people switch to online channels for entertainment. An over-the-top media service is a streaming media service offered directly to viewers via the Internet. OTT bypasses cable, broadcast, and satellite television platforms, the companies that traditionally act as a controller or distributor of such content. According to comScore, around 50 million households across the world, today have OTT video, which they consume in the same time-of-day pattern as traditional TV viewers. It is safe to say that the video medium is being reshaped by OTT video streaming providers.

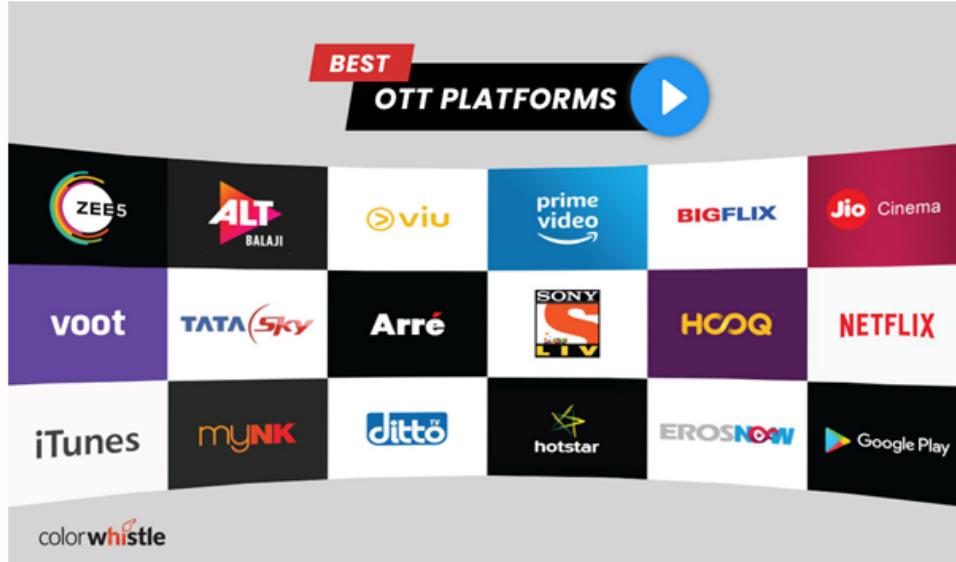


Fig 14.7: OTT Platforms

For a regular user of the Internet, an "OTT app or service" is something like:

- YouTube, Hulu, Netflix or Apple TV for streaming video
- Skype or Facetime for voice/video calls
- WhatsApp or iMessage for messages on a mobile device
- Xbox 360 or World of Warcraft for gaming

OTT in Indian Perspectives

OTT have a great impact and have strategic implications which have changed the dynamics of the video streaming industry especially the OTT services in India. The OTT services have powered the 3rd era of television where the video streaming platform has advanced by adapting formats, enhancing content delivery over networks, seamlessly connected devices and monetization technology. This advent has brought IP video closer to the consumer as well as to businesses.

The increasing penetration of the internet and mobile devices has conveniently spread the mantra of 'anything, anytime, anywhere' which has turned up as the success key for driving the future of OTT services in India. This fairly bright future is observed across all genres of content i.e text, music or video. With improved cellular networks, access to the internet has improved which has made the digital ecosystem even more capable of getting the content consumed also the total spend of mobile and entertainment has exponentially increased because India is approximately adding 40 million new internet users every year.

Check Your Progress B:

1. How is the internet helping copyright issue of publishing services?

2. Explain web communities in the second wave of electronic commerce?

.....
.....
.....
.....

3. What do you understand by digital books?

.....
.....
.....
.....

4. What are the benefits of getting to diversion on the web?

.....
.....
.....
.....

14.13 LET US SUM UP

With the expanding request of web-based business, more organizations are currently searching for better thoughts and occasions to upgrade their reasonable worth. Presumably the electronic trade industry is presently the piece of pretty much every business. The new time of online business website architecture is moving towards the digitalization of numerous enterprises and the movement business is additionally actualizing their business arrangements through it.

Finance is seen as one of the industry's most vulnerable to disruption by software because financial services, much like publishing, are made of information rather than concrete goods. FINTECH is a portmanteau of the terms "finance" and "technology" and refers to any business that uses technology to enhance or automate financial services and processes. The term is a broad and rapidly growing industry serving both consumers and businesses. Financial technology is the technology and innovation that aims to compete with traditional financial methods in the delivery of financial services.

One incredible utilization of online business is to offer monetary types of assistance that broaden the things offered by banks. FinTech organizations may offer normal financial administrations in addition to different administrations. Some alternate ways that FinTech and web-based business sway one another are Advanced currency and crypto currency, Administrations for the unbanked, Lasting digital archive records, Man-made brainpower and Big data mining, Shared transactions, Versatility, Personalization etc.

Travel organizations would now be able to contact your worldwide crowd settling down anywhere on the planet and effectively count their evaluation with rivals to empower them to offer their own clients the ideal alternatives. Some advantages of the online services in the travel industry are Online Booking, Overseeing Recessions, Computerization and Networking, Extra Global Market, Ease of access etc.

From numerous points of view, online closeouts give a business opportunity that is ideal for the Web. A sale site can charge the two purchasers and vendors to take an interest, and it can sell promoting on its pages. Individuals keen on exchanging explicit things can frame a market section that sponsors will pay extra to reach. Few of the examples of online services in Auction are, Closeout escrow benefits, Closeout registry and data administrations, Closeout transfer administrations, Sale programming, Online Auctions and Related Businesses, General Consumer Auctions, Specialty Consumer Auction, Consumer Reverse Auctions and Group Purchasing Sites, Business-to-Business Auctions, Business-to-Business Reverse Auctions etc.

Online or web-based learning is schooling that happens over the Internet. It is frequently alluded to as "e-learning" among different terms. Notwithstanding, internet learning is only one kind of "distance learning" - the umbrella term for any discovery that happens across distance and not in a conventional homeroom. Distance learning has a long history and there are a few kinds accessible today, including Correspondence Courses, Tele courses, Compact disc ROM Courses, Web based Learning, Portable Learning etc.

Internet learning is catalyzing an instructive move by the way we educate and learn. There is a move away from top-down addressing and inactive understudies to a more intuitive, community-oriented methodology in which understudies and teachers co-make the learning cycle. The Instructor's job is transforming from the "sage on the stage" to "the guide as an afterthought." Some of the fundamental focal points of online learning includes Convenience, Enhanced Learning, Levelling of the Playing Field, Interaction, Innovative Teaching, Improved Administration, Savings, Maximize Physical Resources, Outreach etc.

Utilizing the Internet has just reformed business, banking, individual correspondences and shopping. All the more as of late the entire range of diversion media has begun to be centred around giving on the web access to the expression 'online diversion' basically includes getting to material, for example, music and movies over the Internet. This can be either watching or tuning in to programs as they occur (live streaming) or to keep it on your gadget to appreciate sometime in the not-too-distant future based on your very own preference (downloading). Various types of online diversion are accessible which includes Online books (digital books), Online music (streaming or downloading from collections, playlists or radio broadcasts), Online TV and film seeing (streaming or downloading), Online games etc.

14.14 KEY WORDS

Business-to-Business Auctions: B2B auctions takes place across a range of industries and instantly connect buyers and vendors on an international scale in real-time.

Digital Books: A digital book, also known as an e-book or electronic book, is a book publication made available in digital form, consisting of text, images, or both, readable on the flat-panel display of computers or other electronic devices.

E-auction: E-auction is the process of conducting an auction to sell assets, natural resources or other goods through online competitive bidding.

Online Entertainment: Online social entertainment blends entertaining interactive functionality and content including live video streaming, video chat communications, multi-player gaming, music and videos streaming, with social networking service such as social graph management, forums, reviews, ratings, and geo-location options.

Online Learning: Online learning is education that takes place over the Internet. It is often referred to as “e- learning” among other terms. In short it is an umbrella term for any learning that takes place across distance and not in a traditional classroom.

Specialized Web Auction Sites: Specialized Web auction sites meet the need of special interest market segments.

Speciality Consumer Auctions: Specialty consumer auction sites gain an advantage by identifying a strong market segment with readily identifiable products.

14.15 TERMINAL QUESTIONS

1. What are E-services? What are the various advantages of E-services?
2. Explain the significance of E-auction.
3. How is the internet aiding in the financial services?
4. What are the various technologies used by FinTech?
5. What is the significance of virtual communities and web portals?
6. How the internet revamped the travel industry?
7. Explain the various online publishing strategies.
8. Explain the various online publishing approaches.
9. How is internet helping in entertainment industry?
10. What is online leaning? What are its various focal points?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.

UNIT 15 APP BASED COMMERCE

Structure

- 15.0 Objectives
- 15.1 Introduction
- 15.2 What is an App?
 - 15.2.1 Classification of Apps
 - 15.2.2 Types of Apps
- 15.3 Steps for App Development
 - 15.3.1 Defining Mobile App Objective
 - 15.3.2 Preliminary Design
 - 15.3.3 Market Research
 - 15.3.4 Market Analysis
 - 15.3.5 Collection of Users Feedback
 - 15.3.6 Financial and Technical Feasibility
 - 15.3.7 Testing of App Prototype
 - 15.3.8 Launching the App
 - 15.3.9 Official Release
- 15.4 Mobile Development Frameworks
 - 15.4.1 Native Mobile App Development
 - 15.4.2 Cross-Platform mobile App Development
- 15.5 App Store
- 15.6 Apps for Various Domains & Segments
- 15.7 Let Us Sum Up
- 15.8 Keywords
- 15.9 Answers to check your progress
- 15.10 Terminal Questions

15.0 OBJECTIVES

After studying this unit, you should be able to:

- understand what is an App and its various types;
- describe various steps for App development;
- know about various App development frameworks;
- know about various types of App store;
- know about different Apps for various domains and segments;
- Explain and plan a framework for a business App.

15.1 INTRODUCTION

In the present time, with the rapid technological disruption, mobile phones have become an inevitable part of human life. Even though the primary function of mobile phones is telecommunication but with the technological upfront they have made many things possible which were unimaginable earlier. Now the things have changed with the advent of smart phones, each person today owns his/her own mobile phone. Accessibility to smart phones has made our life easier in many ways. The main advantage of mobile phones are its portability, you can carry them in your pockets wherever you go. Smart phones introduced a new face to service sector with the invention of mobile apps. Mobile apps basically are applications designed to perform a specific task at the user's fingertip. The services that mobile apps and smart phone provide are plenty.

15.2 WHAT IS AN APP?

An app is short form of a term called "application," it is basically a type of software that can be installed and run on a computer, tablet, Smartphone or other electronic devices. An app is simply a piece of software that you can get access to and use through the internet. A mobile application, also referred to as a mobile app or simply an app, is a computer program or software application designed to run on a mobile device such as a phone, tablet, or watch.



Fig 15.1: App Icon in a Mobile or smart phone

Many apps are also available for mobile devices and even for TVs. We will discuss about it in a more elaborate manner in coming heads of the unit, some are useful for desktop and some are useful for Mobile.

15.2.1 Classification of Apps

Mobile applications may be classified by numerous methods. A common scheme is to distinguish native, hybrid, and web-based apps. A brief about all these is given below:

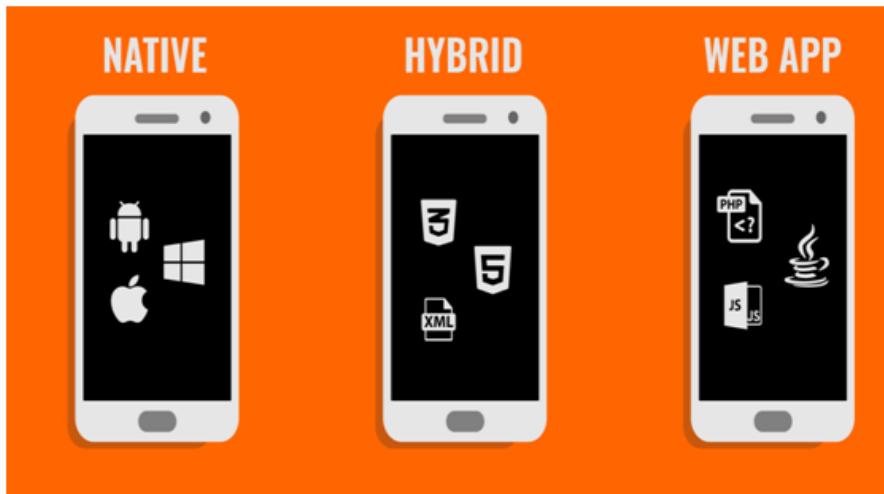


Fig 15.2: Native, Hybrid & Web Apps

1. **Native Apps:** Native apps are developed for their particular platform, taking full advantage of the software and the operating systems' features. These apps can directly access the hardware of the device such as the GPS, camera, microphone, etc. so they are faster in execution, which ultimately results in better user experience. All apps targeted toward a particular mobile platform are known as native apps. Therefore, an app intended for Apple device does not run in Android devices. As a result, most businesses develop apps for multiple platforms. While developing native apps, professionals incorporate best-in-class user interface modules. This accounts for better performance, consistency and good user experience. Users also benefit from wider access to application programming interfaces and make limitless use of all apps from the particular device. Further, they also switch over from one app to another effortlessly. The main purpose for creating such apps is to ensure best performance for a specific mobile operating system.
2. **Hybrid Apps:** The concept of the hybrid app is a mix of native and web-based apps. Apps developed using Apache Cordova, Xamarin, React Native, Sencha Touch and other similar technology fall into this category. These are made to support web and native technologies across multiple platforms. Moreover, these apps are easier and faster to develop. It involves use of single code base which works in multiple mobile operating systems. Despite such advantages, hybrid apps exhibit lower performance. Often, apps fail to bear the same look-and-feel in different mobile operating systems.

3. Web-based Apps: Web-based applications are a particular type of software that allows users to interact with a remote server through a web browser interface. It works on any browser whether it is chrome, opera or Samsung internet browser and the users are not obliged to download from the app store. These apps have seen a huge increase in popularity in recent years, replacing desktop applications and becoming a crucial instrument for small and large businesses around the world. A web-based app is coded in HTML5, CSS or JavaScript. Internet access is required for proper behavior and user-experience of this group of apps. These apps may capture minimum memory space in user devices compared to native and hybrid apps. Since all the personal databases are saved on the Internet servers, users can fetch their desired data from any device through the Internet.

15.2.2 Types of Apps

1. Desktop Applications: There are countless desktop applications, and they fall into several categories. Some are more full featured (like Microsoft Word), while others may only do one or two things (like a clock or calendar app). Below are just a few types of applications you might use.

- **Word processors:** A word processor allows to write a letter, design a flyer, and create many other types of documents. The most well-known word processor is Microsoft Word. We had elaborately discussed about this application software in our previous course (BCOS-184: Computer Application in Business) in an elaborate manner.

- **Media players:** If you want to listen to MP3s or watch downloaded movies, you'll need to use a media player. Windows Media Player and iTunes are popular media players which are also covered in our previous unit 14 in a much more elaborate manner.

2. Mobile Apps: Desktop and laptop computers are not the only devices that can run applications. You can also download apps for mobile devices like smart phones and tablets. Here are a few examples of mobile apps.

- **Gmail:** Gmail is used to view and send emails from your mobile device. It's available for Android and iOS devices.

- **Instagram:** Instagram allows to quickly share photos with your friends and family. It is available for Android and iOS.

- **Duolingo:** With a combination of quizzes, games, and other activities, Duolingo app can help learn new languages. It is available for Android and iOS.

15.3 STEPS FOR APP DEVELOPMENT

Development of an app is a comprehensive task involving various steps, a brief of all the important steps which needs to be followed while developing any app is described below:

15.3.1 Defining Mobile App Objectives

To clearly set and define the objectives for which App is being made is an important part of the App making process. Following points are important to consider before App designing is defined -

- What is the main purpose of making App?
- What are the main features of App that will be useful for customers?
- How this App will be useful in solving problems of the customers?

Predefined App features are very useful in assessing the total development budget of the App. However, research indicates that app design should prioritize user involvement over proprietary offerings when it comes to prioritizing features.

15.3.2 Preliminary Design

Deciding about preliminary design is the first step of an app development, it is important to take time to design an app's fundamental structure. Before the next step, it is always advisable to spend enough time to design the App preliminary. The concept building for production of clear understanding of each and every small element of the app is important. This phase does not take much time for simple app design, but will take time in case of complex applications design.

15.3.3 Market Research

There might be several innovative apps to start various business projects, but before you move into design and development, it is always better to do research work in terms of market requirement. A small research project with the following questions can support the project much before planning and development work begins -

- What are marketing plans for this App?
- Who are target audience for this App?
- How do you want your customers to use your app?
- Which software platform and framework will be used to make it?
- Which mobile app development language will be used?
- Who are your competitors and what is their strategy? Do they have apps? If so, what features do they offer?
- What is overall app development budget?
- What is timeline for development? When will App be launched?

Details on research should also be shared with distribution, product creation and IT managers including the Software development team. Feedback from all departments concerned is necessary before the App development work begins. But the key issue behind evaluating the marketplace is to obtain a detailed understanding of why and how. How did you say that you would sell one million apps? You can answer the question quite clearly if you have done your market research. Wild assumptions find no place.

15.3.4 Market Analysis

A market analysis is a quantitative and qualitative assessment of a market. It looks into the size of the market both in volume and in value, the various customer segments and buying patterns, the competition, and the economic environment in terms of barriers to entry and regulation. The market for mobile apps is growing rapidly like never before. Due to the pandemic, the number of apps downloaded has increased a lot.

15.3.5 Collection of Users Feedback

After the App is ready, share it with friends and relatives and co-workers to get their feedback and modify the App accordingly. Following questions may be asked during this feedback -

- Is this app useful?
- Will this app be used?
- What is the tentative cost of this App?
- Is there anything which can be added to it to make it more useful?

Another essential aspect of market research is the discovery of existing applications in the same category to improve the novelty of the product and to make the new app better appreciated by the consumer. Apps performing any related role must be studied and evaluated to understand where the behaviours are wrong and what others are doing right.

15.3.6 Financial and Technical Feasibility

It is always necessary to check the financial and technical viability of the entire plan before developing app. It is required to verify whether this software can be developed and whether existing technology funding is available to develop this application.

Financial Feasibility: Financial analysis is an essential activity in order to achieve financial viability. It is important to understand App's fixed cost, to estimate profit from consumers. The financial plan should also cover publicity, advertisement and web hosting expenses. Rental fee for App Store should be included as well. A balanced financial plan must be established in advance

Technical Feasibility: Technical feasibility means checking the possibility if App can be developed by using the latest technology or not. It is important to check if organization is capable enough to use the latest technology or not. After the financial evaluations, there may be some technical questions to

answer as well. It is better to discover these aspects before investing significant time and money into a project. You might not be able to find definitive answers to every technical question, but if you do your homework you will at least be able to intelligently discuss technical concerns with the programmer/ expert selected/hired to ensure expected outcomes.

15.3.7 Testing of App Prototype

This is an important stage in the lifecycle of app development. After completing the App with exciting graphics and text, it is important for the app to be thoroughly tested and corrected under a range of real-world scenarios. Link to your original records of design and planning and check all functions.

When checking the Software, take feedback from other users. Mobile online research tools can also be used to collect feedback and analysis in real time. Tests for image, graphics and user interface compatibility across the platform are also needed. When app provides the desired output in all scenarios including appearance and usability of the interface, it is time to make the final preparations to launch this mobile app.

15.3.8 Launching the App

The process of releasing an app in the market is extremely critical, as it is largely dependent on the success of this application. For branding and marketing the App, it is always advisable to hire a good marketing agency who will make efforts to launch the App in a very professional manner. Marketing is also one of the most critical activities to get involved at an early stage in the process. The Digital Marketing Team supports keyword analysis, important for SEO and App Store Optimism (ASO), both crucial to discovery. The next step is the submission of the mobile app for sale in different markets. Before starting this phase, high-quality screenshots of the application and promotional video and/or demo must be ready for better results.

In order to promote the app, a website would also be important. This is important for branding and recognition, as well as for searching and finding. Promotion of App should be done through organization's website and social media accounts, blogs etc. to target niche market, e mail campaigning can also be done. To increase awareness of the App to target audience, App Analytics of Google Analytics can also be used in the beginning.

15.3.9 Official Release

Up until this point, App's official release date should be the climax of app marketing efforts. Influential bloggers and journalists could write some papers and articles to apprise the people who showed interest in the App before the launch. There could also be a promotional e-mail drive to attract downloads and raise momentum. If the app is published, try keeping user of the app committed by announcing a special deal or promotion using push notifications so that users open the app. Consider having rewards for consumers to download App, such as a single discount, or free product or

service. App marketing has never been stopped and needs new technologies every day.

Build a simple collaborative feedback channel and respond to users' comments and concerns. Updating your customers quickly will work wonderful. Make sure you evaluate and track those KPIs that identify your marketing goals effectively.

15.4 MOBILE DEVELOPMENT FRAMEWORKS

Over the last few years, the number of smart phone users around the world has grown enormously. There are various types of Mobile Development Frameworks as discussed below:

15.4.1 Native mobile app development

The majority of mobile frames are for cross-platform construction. Generally, the development of a mobile app utilizes frameworks developed by the mobile platform company. We generally use the iOS SDK for iOS—the IDE, i.e., the development software pack. For the development of an Android app, Android SDK is the choice. The frameworks are in the SDKs, each of which has the programming languages. SWIFT or Goal-C are used for iOS and Kotlin or Java for Android.

Typically, native apps are fast. They are fully compliant with the hardware and native functions of the computer, such as camera, accelerometer, etc. They may be very costly, on the other hand. A business or company must concentrate on all major mobile platforms, especially Android and iOS. This means that a separate development team is required to develop an app for their business. It is necessary to maintain the app after deployment which makes the process of setup very expensive.

15.4.2 Cross-platform mobile app development

Mobile cross-platform frames are designed to build mobile applications on more than one platform. Most, if not all of the common cross-platform frames have support Android and iOS development. There are following frameworks as discussed in detail below with their respective advantages and disadvantages:

1. **Ionic:** Ionic is an Angular and Apache-Cordova cross-platform system. It helps you to build applications for more than one mobile platform. An application will work for both iOS and Android on the Ionic cross-platform system. Ionic apps have been created and are built like web apps using standard web technologies such as HTML, CSS and Angular. But Cordova, depending on it, makes it possible to use the native features of the unit. Various advantages and disadvantages of Ionic are discussed below:

Advantages

- As a company owner, you not only need to employ two sets of software developers, but you can use your current web development team to create a mobile app for your audience.
- It saves time and expense by using the Ionic production system.
- Ionic uses web technology, so working with them is easy.

Disadvantages

- In comparison to native apps, ionic apps are less effective.
- Ionic is not the best choice to create apps with high requirements for graphics processing.

2. **Xamarin:** In 2016, Microsoft purchased and opened Xamarin from its owners. Xamarin is a C#-based cross-platform architecture that takes a particular approach for designing cross-platform applications. Unlike hybrid frameworks, which use web technologies, it compiles the individual platforms into native code. Various advantages and disadvantages of Xamarin are discussed below:

Advantages

- Apps that are built using Xamarin have little or no difference as compared to native app output.
- Xamarin helps to create rich UI experiences.
- Xamarin will only share about 90 percent of the codebase for all platforms for you to build the user interface separately for each platform.
- A standard UI can be built across all Xamarin Forms platforms.

Disadvantages

- Xamarin implementations are typically very wide. A simple Android app "Hello World" could take around 16mb.
- Xamarin developers do need some knowledge of their mother tongues. For iOS and Kotlin/Java for Android, Swift/Objective-C.
- While Xamarin itself is free, IDE used for production can be very costly for businesses.
- The incorporation of third-party libraries into Xamarin is often a concern. Although Xamarin tools and libraries provide complete support for native technologies, Xamarin may not be provided by a vendor.

3. **React Native:** React Native is a Facebook mobile platform for the development of mobile applications. It is developed on JavaScript and ReactJS. Contrary to hybrid applications, React Native also uses online technology internally. The web views are not included. It uses actual components of Android or iOS to create user interfaces. It has XML like JSX (Javascript-XML) for the creation of the user interface. React Native then calls for the platform-specific native rendering APIs, i.e. Rendering the programme on the screen with Swift and Java. Various advantages and disadvantages of React native are discussed below:

Advantages

- Respond Native's creation of software saves time. It has a "Hot Reload" feature which lets you view code changes on the phone right away.
- Like Ionic, a new group of developers is not needed to be employed. With React Native, web developers can easily migrate to mobile applications.
- Several ready-made components can be used for production.
- React native-built applications are fast and comparable in compiling them to native code, with native app results.

Disadvantages

- The output is not like that of native apps, as with other cross platform apps. No issue with easy applications. However, applications that require advanced features would develop problems.
 - Apps developed with React Native may have memory management problems due to their Javascript history.
 - Apart from the React Native team ready-made parts, third-party vendors exist. But the components that they create most frequently appear to be inferior. There are a lot of bugs and malfunctions sometimes.
4. **Flutter:** Flutter is a Google-developed mobile user interface to create a beautiful and interactive interface that takes another approach to cross-platform creation. Unlike hybrid apps that make use of web views, or React Native apps that use native components, Flutter apps fully compile to native code. This native ARM-code compilation means that there is no layer between the system and the CPU that makes apps that are entirely native to Flutter. Flutter can do this by using its own graphics engine called Skia, a popular Google-owned 2D graphics engine. Flutter is developed with a Dart programming language that is object oriented. Various advantages and disadvantages of flutter are discussed below:

Advantages

- Flutter apps are very fast at about 60 fps (frames per second). There are even measurements by some developers in Germany of 120 fps.
- As usual, a single codebase means time and money is saved.
- As with React Native above, Flutter also gives ability to see changes made in code, the instance which is made on mobile hardware, emulator or simulator. This also makes debugging the app much easier.
- Flutter is open source. So is Dart and its graphics engine- Skia.

Disadvantage

- Developers have to learn a new language as Flutter doesn't make use of any previously known language. Although Dart is fairly easy to pick up and this isn't really an issue.
- Games and apps that require a lot of device-specific functions are better off not developed with flutter.

There are many items that rely on knowing the right structure to use. The best choice is to create a game or app that needs a significant number of device-specific functions. However, if your mobile app is reasonably simple, cross-platforming is the best choice because it saves time and money.

Comparison among all these four is given below:

Table 15.1: Comparative Analysis of Mobile Development Frameworks

Basis	React Native	Ionic	Xamarin	Flutter
Developers	Facebook	Drifty	Microsoft	Google
Language	JavaScript	TypeScript	C#	Dart
Performance	Close to native	Moderate	Moderate	Amazing controller
Code resusability	90%	98%	98%	50-90%
Testing	Mobile device or emulator	Any browser	Mobile device or emulator, test cloud	Mobile device or emulator
GUI	Uses native UI controller	HTML, CSS	Uses native UI controllers	Use Proprietary widgets and deliver UI
Apps	Airbnb, Discord, Instagram	MarketWatch, Pacifica, JustWatch	Olo, Stroyo, Apx	KlasterMe, PostMuse Reflectly

Check Your Progress A

1. Fill in the blanks with appropriate words:

- i) is an essential activity in order to achieve financial viability.
- ii) means to check if App can be developed by using the latest technology or not.
- iii) For the development of an app, Android SDK is the IDE of choice.
- iv) frames are designed to build mobile applications on more than one platform.
- v) is an Angular and Apache-Cordova cross-platform system.

2. State whether the following are true or false.

- i) Feasibility problem relates to whether a mobile device app is more suitable than a web application.
- ii) Native apps are fast.
- iii) In comparison with native apps, ionic apps are more effective.
- iv) While Xamarin itself is free, IDE used for production can be very costly for businesses.
- v) React native-built applications are fast and comparable in compiling them to native code, with native app results.

3. What are the advantages of Flutter Apps?

.....
.....
.....
.....
.....

4. What do you mean by React Native?

.....
.....
.....
.....
.....

15.5 App Store

Apps were in the beginning planned for efficiency assistance such as email, calendar, and contact databases, but the public demand for apps caused rapid expansion into other areas such as mobile games, factory automation, GPS and location-based services, order-tracking, and ticket purchases, so that there are currently millions of apps accessible. Apps are in general downloaded from application distribution platforms which are operated by the owner of the mobile operating system, known as App stores. Most popular types of APP stores are such as Google Play Store and IOS App Store (iOS), explained in detail below:

Types of APP Store

1. Google Play Store: Google Play Store, in the past known as Android Market, is a digital distribution service operated and developed by Google. It provides as the official app store for certified devices running on the Android operating system, allowing users to browse and download applications developed with the Android software development kit (SDK) and published through Google. Google Play also serves as a digital media store, offering music, books, movies, and television programs.



Fig 15.3: Google Play Store

The services integrated in Google Play are Google Play Books, Google Play Games, and in earlier times included Google Play Music before being discontinued in favor of YouTube Music and Google Podcasts in December

2020, Google Play Newsstand before it was phased out in November 2018, and Google Play Movies & TV before being renamed to Google TV in September 2020.

Google states in its Developer Policy Center that "Google Play supports a diversity of monetization strategies to benefit developers and users, including paid distribution, in-app products, subscriptions, and ad-based models", and requires developers to comply with the policies in order to "ensure the best user experience". It requires that developers charging for apps and downloads through Google Play must exercise Google Play's payment system. In-app purchases unlocking additional app functionality must also use the Google Play payment system, except in cases where the purchase "is exclusively for physical products" or "is for digital content that may be added outside of the app itself (e.g. songs that can be played on other music players)

Find & download apps or digital content

- a) On your device, open Google Play Store. or visit the Google Play store on a web browser.
 - b) Search or browse for content.
 - c) Select an item.
 - d) Select Install and pay item's price.
 - e) Follow the on-screen instructions to complete the transaction and get the content.
2. **iOS App Store (iOS):** The iOS App Store is a digital distribution platform, developed and maintained by Apple Inc., for mobile apps on its iOS & iPadOS operating systems. The store allows users to browse and download apps developed with Apple's iOS Software Development Kit. The Apple Store app provides a more delicate way to shop for the most up-to-date Apple products and accessories.



Fig 15.4: iOS App Store

How to get the App Store on iOS?

1. Launch Settings app on your iOS device.
2. Now, tap on Screen Time.
3. Now Content & Privacy Restriction.
4. Next, you have to enter your Restrictions passcode.
5. Now tap on iTunes & App Store Purchases.
6. Click on Installing Apps.
7. Now, make sure the switch next to Installing Apps is ON. If in case, it is Off turn it On.

15.6 APPS FOR VARIOUS DOMAINS & SEGMENTS

There are various types of Apps developed and confined to various domains, a brief about all that is explained below:

- 1. Augmented and Virtual Reality App:** Virtual reality apps are one of the most popular apps developed in the segment. Many of the VR based app are most popular among users few examples of such apps are Pokemon Go, Google Map etc. Pokemon Go with its augmented reality mode broke the app market and became viral. The well-known social application with Google Maps became top app from last many years as the number of users of this application is constantly growing. Another VR app worth mentioning is Just a Line, an experimental app that allows you to make simple drawings using your phone in augmented reality, film a short video, and share it with your friends. Mobile virtual reality or VR has never been that affordable. Anyone who has a smartphone can purchase a cardboard VR headset to get the experience of VR apps available for download in app stores or to watch 360-degree videos on Youtube.
- 2. Artificial Intelligence Apps:** Artificial Intelligence is more than just an assistant, it learns from user behaviour, it is integrated into chatbots and thus leverages user experience in-app. AI can not only make your app smarter but also saves money. No doubt everyone who has a smart phone has at least heard of Siri or Google Assistant or similar AI apps that aim to make our life easier by searching for information using voice commands.



Fig 15.5: Artificial Intelligence

- 3. Retail Shopping Apps:** These days retail shoppers are not lacking behind in competition. They have also started leveraging benefits of new technology by developing their online apps. Nowadays a shop doesn't have to be big to start taking benefits from creating its mobile app. The advantage of having a mobile application for even a small business is that it increases brand recognition and brings the e-

commerce user experience to a whole new level, it helps to build customer loyalty, to collect feedback as well as simply stand out from the crowd. For example, Max, FBB and Reliance Trends have made their omni channel presence.

4. **Restaurants and Food Delivery Apps:** More and more people prefer to check the place and its menu before actually going there. Restaurant and food apps encourage clients' interaction, develop loyalty, and increase brand recognition.



Fig 15.6: Food Delivery Apps

In 2020, the top food app became Uber Eats with its sales system, built-in navigation, and online payments. Another popular app in the food sector turned out to be Domino's Pizza app that helps you to place your order using AI and track your pizza location on the map and also allows pre orders and thus saves waiting time.

5. **Mobile Wallets, Banking and Finance Apps:** In coming years, the number of financial apps users is going to reach in billions. On average users check their bank account and make some transfers using apps every day. Mobile wallets, and other popular online payment trends in the last years, is a great option for those who do not want to carry the plastic debit and credit cards but rather just take their smart phone whenever they go out. Android users can install Google Pay while people who prefer iOS can use Apple Pay. The online payment apps provide great ease and convenience to the users. Also have some add on benefits such as cash back, discounts etc. which is found to be more lucrative.
6. **Video Streaming Apps:** Video Streaming are one of the most popular apps especially in the adolescent segment. Gone are the days when people used to wait for going to the theatre to watch any movie. A huge upsurge was noticed in the times of COVID especially in the entertainment industry. Most of the movies were launched on these platforms giving viewers a wide access with no extra cost.



Fig 15.7: Netflix

Netflix, the leading TV show broadcasting service, was ahead in annual consumer spending in 2020, while YouTube was number one in time spent. YouTube Kids aimed at children aged 4 and up, meant to protect them from inappropriate content, also remained among leaders in some countries. The video streaming service for gamers Twitch was in the top five apps by time spent in countries such as the US, Canada, Australia, to name a few.

Check Your Progress B

1. What do you understand by Google play store?

.....
.....
.....
.....

2. How to get the App Store on iOS?

.....
.....
.....
.....

3. What is augmented reality or virtual reality based apps?

.....
.....
.....
.....

4. State some of the popular examples of retail shopping apps.

.....
.....
.....
.....

15.7 LET US SUM UP

An app is short form of a term called "application," it is basically a type of software that can be installed and run on a computer, tablet, Smartphone or other electronic devices. An app is simply a piece of software that you can get access to and use through the internet. Many apps are also available for mobile devices and even some TVs. Mobile applications may be classified by numerous methods. A common scheme is to distinguish native, hybrid, and web-based apps. Native apps are developed for their particular platform, taking full advantage of the software and the operating systems' features. Web-based applications are a particular type of software that allows users to

interact with a remote server through a web browser interface. The concept of the hybrid app is a mix of native and web-based apps. Then there are few popular desktop applications such as word processor and media players and mobile apps such as Gmail, Instagram, duolingo etc.

Development of an app is a comprehensive task involving various steps, which needs to be followed while developing any app such as, defining mobile app objectives, preliminary design, market research, market analysis, collection of users feedback and information about competitors, financial and technical feasibility, testing of app prototype, launching the app, official release.

Over the last few years, the number of smart phone users around the world has grown to the trillions. Many companies are now focused on developing mobile apps for their consumers with a website. There are various types of Mobile Development Frameworks such as, Native mobile app development-typically, native apps are fast. They are fully compliant with the hardware and native functions of the computer, such as camera, accelerometer, etc. Cross-platform mobile app development: these are designed to build mobile applications on more than one platform. The most popular cross platform development frameworks are Ionic, Xamarin, React Native, Flutter.

Apps were in the beginning planned for efficiency assistance but the public demand for apps caused rapid expansion into other areas. Apps in general are downloaded from application distribution platforms which are operated by the owner of the mobile operating system, known as App stores. Most popular types of APP stores are such as Google Play Store, which is a digital distribution service operated and developed by Google and IOS App Store (iOS), which is a digital distribution platform, developed and maintained by Apple Inc., for mobile apps on its iOS & iPadOS operating systems.

There are various types of Apps developed and confined to various domains such as Augmented and Virtual Reality Apps, Artificial Intelligence Apps, Retail Shopping Apps, Restaurants and Food Delivery Apps, Mobile Wallets, Banking and Finance Apps, Video Streaming Apps.

15.8 KEYWORDS

App: An app is short form of a term called "application," it is basically a type of software that can be installed and run on a computer, tablet, Smartphone or other electronic devices.

Flutter: Flutter is a Google-developed mobile user interface to create a beautiful and interactive interface that takes another approach to cross-platform creation. Unlike hybrid apps that make use of web views, or React Native apps that use native components, Flutter apps fully compile to native code.

Google Play Store: Google Play Store, in the past known as Android Market, is a digital distribution service operated and developed by Google. It provides as the official app store for certified devices running on the Android operating system.

Hybrid Apps: The concept of the hybrid app is a mix of native and web-based apps. Apps developed using Apache Cordova, Xamarin, React Native, Sencha Touch and other similar technology fall into this category.

Ionic cross-platform system: Ionic is an Angular and Apache-Cordova cross-platform system. It helps you to build applications for more than one mobile platform. An application will work for both iOS and Android on the Ionic cross-platform system.

iOS App Store: The iOS App Store is a digital distribution platform, developed and maintained by Apple Inc., for mobile apps on its iOS & iPadOS operating systems. The store allows users to browse and download apps developed with Apple's iOS Software Development Kit.

Native Apps: Native apps are developed for their particular platform, taking full advantage of the software and the operating systems' features. These apps can directly access the hardware of the device such as the GPS, camera, microphone, etc.

React Native: React Native is a Facebook mobile platform for the development of mobile applications. It is developed on JavaScript and ReactJS. Contrary to hybrid applications, React Native also uses online technology internally. The web views are not included.

Technical Feasibility: Technical feasibility means to check if App can be developed by using the latest technology or not. It's important to check if organization is capable enough to use the latest technology or not.

Web-based Apps: Web-based applications are a particular type of software that allows users to interact with a remote server through a web browser interface.

15.9 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A

1. (i) Financial analysis (ii) Technical feasibility (iii) Android (iv) Mobile cross-platform (v) Ionic
 2. (i) True (ii) False (iii) False (iv) True (v) True
-

15.10 TERMINAL QUESTIONS

1. What are the three broad classifications of an app?
2. What are the various types of desktop and mobile apps?
3. What are the activities required for concept building?
4. Describe the various steps of an App development process.
5. What do you mean by financial and technical feasibility of the plan?
6. What are the two types of mobile development frameworks?
7. What is an app store? What are its various types?

8. What is an ionic cross-platform system? State its advantages and disadvantages.
9. What is Flutter? State its advantages and disadvantages.
10. State the differences among React native, Ionic, Xamarin and Flutter.
11. What are different types of apps in various domains and segments?



Note

These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for your practice.





Indira Gandhi National Open University
School of Management Studies