

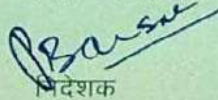
Approval of the Content Design Committee is attached here.

दूरस्थ शिक्षा संचालनालय, देवी अहिल्या विश्वविद्यालय इन्दौर

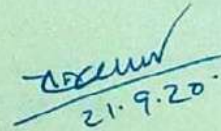
दूरस्थ शिक्षा संचालनालय में दिनांक 21.09.2020 को विभागीय समिति की बैठक आयोजित की गई, जिसमें नए पाठ्यक्रमों के लिए स्टडी मटेरियल (SLM) एवं E-Learning Materials तैयार करने हेतु विषय विशेषज्ञ (Content Design Committee) बनाने की अनुशंसा विभागीय समिति द्वारा की गई है। जिनके नाम इस प्रकार हैं

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विभागीय समिति की अनुशंसा सहित सक्षम स्वीकृति हेतु प्रस्तुत।


निदेशक

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Honble VC
स्वीकृत
Hain
21-9-2020
The Director, DDE


21.9.20

31.05.2022

CDOE, DAVV shall be offering following program in ODL mode from the forthcoming session after the approval of DEB-UGC:

1. MBA (Finance/Marketing/HR)
2. MBA (Energy management)
3. MA (Sociology)
4. MA (Economics)
5. MCA


It is proposed that out of total subject being taught in above mentioned two-year PG programs, a maximum of 40 % SLMs be outsourced, and remaining be prepared in-house.

For outsourced SLMs, norms of the University shall be followed.

Submitted for kind approval.


Director, CDOE



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CDOE shall be offering MBA program in ODL mode from the forthcoming session after the approval of DEB-UGC. It is proposed that following experts for the content creation, SLM writing and editing may be approved for the subjects of MBA first year. These experts shall be paid honorarium as per the University norms.

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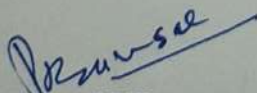
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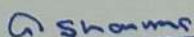
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| 2 | Marketing Management – I | Prof. Vinay Joshi | Freelancer/Industry Expert | Outsourced |
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| 10 | IT Applications for Business | Dr. Pratosh Bansal | CDOE, DAVV | Inhouse |
| 11 | Quantitative Methods | Dr. Naresh Dembla | IIPS, DAVV | Inhouse |
| 12 | Financial Management | Dr. Kapil Sharma | IMS, DAVV | Inhouse |
| 13 | Operation Research | Dr. Vivek Sharma | IMS, DAVV | Inhouse |
| 14 | Marketing Management II | Dr. Geeta Nema | IIPS, DAVV | Inhouse |
| 15 | Introduction to Business Analytics | Dr. Naresh Dembla | IIPS, DAVV | Inhouse |
| 16 | Business Research Methods | Dr. Vivek Sharma | IMS, DAVV | Inhouse |

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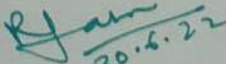

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CDOE shall be offering MBA (Energy Management) program in ODL mode from the forthcoming session after the approval of DEB-UGC. It is proposed that following experts for the content creation, SLM writing and editing may be approved for the subjects of MBA (Energy Management) first year. These experts shall be paid honorarium as per the University norms.

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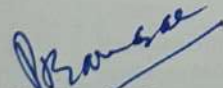
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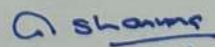
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| 1 | Principles and Practices of Management | Dr Rajeev Shukla | Freelancer/Industry Expert | Outsourced |
| 2 | Solid Waste Management | Dr. R N Singh | School of Energy DAVV, Indore | Inhouse |
| 3 | Water and waste water Pollution & Control Management | Dr Sukti Tomar | Freelancer/Industry Expert | Outsourced |
| 4 | Heat Transfer | Dr Jay Balwanshi | Freelancer/Industry Expert | Outsourced |
| 5 | Financial Management | Dr Manish Sitlani | IIPS, DAVV | Inhouse |
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| 7 | Wind Energy Technologies | Dr Vikas Ahirwar | Freelancer/Industry Expert | Outsourced |
| 8 | Solar Energy Technologies | Dr Digvijay Singh | Freelancer/Industry Expert | Outsourced |


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CDOE shall be offering MA (Economics) program in ODL mode from the forthcoming session after the approval of DEB-UGC. It is proposed that following experts for the content creation, SLM writing and editing may be approved for the subjects of MA (Economics) first year. These experts shall be paid honorarium as per the University norms.

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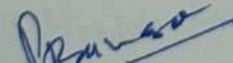
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| 3 | Public Economics | Dr. Sujata Parwani | Freelancer/Industry Expert | Outsourced |
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| 6 | Communication and personality development | Dr. Monalisa Khatre | Freelancer/Industry Expert | Outsourced |
| 7 | Theory of Market Distribution | Dr. Sakhamam Mujalde | SOEco, DAVV | Inhouse |
| 8 | Theories of Money and Banking | Dr. Ekta Rokade | SOEco, DAVV | Inhouse |
| 9 | Advance Agricultural Economics | Dr. M. Vasim Khan | SOEco, DAVV | Inhouse |
| 10 | Statistical Inferences and Research Methods | Dr. M. Vasim Khan | SOEco, DAVV | Inhouse |
| 11 | Rural Economics | Dr. Neha Gupta | Freelancer/Industry Expert | Outsourced |
| 12 | Demography | Suvi Jain | Freelancer/Industry Expert | Outsourced |
| 13 | Computer Applications | Dr. Pratosh Bansal | CDOE, DAVV | Inhouse |

Submitted for kind approval.


Director, CDOE

Hon'ble Rector / VC

A. Shams
30.6.2022

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*The Director,
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CDOE shall be offering MCA program in ODL mode from the forthcoming session after the approval of DEB-UGC. It is proposed that following experts for the content creation, SLM writing and editing may be approved for the subjects of MCA first year. These experts shall be paid honorarium as per the University norms.

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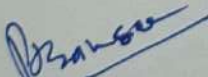
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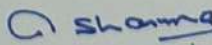
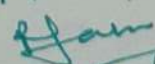
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| 2 | Mathematical Foundation for Computer Application | Dr Sufia Aziz | IET, DAVV, Indore | Inhouse |
| 3 | Data Structures using C++ | Mr Rajesh Chakravarty | Freelancer/Industry Expert | Outsourced |
| 4 | Operating Systems | Mr Awanish Tiwari | Freelancer/Industry Expert | Outsourced |
| 5 | Communication Skills and Report Writing | Dr. Ruchi Singh | IET, DAVV, Indore | Inhouse |
| 6 | Database Management System | Dr Pratosh Bansal | CDOE, DAVV, Indore | Inhouse |
| 7 | Software Engineering | Mr Rohit Bansal | Freelancer/Industry Expert | Outsourced |
| 8 | Design and Analysis of Algorithm | Mr Ravi Jain | Freelancer/Industry Expert | Outsourced |
| 9 | Computer Networks | Dr Praveen Gupta | Freelancer/Industry Expert | Outsourced |
| 10 | Internet and Web Technology | Dr Durgesh Mishra | Freelancer/Industry Expert | Outsourced |

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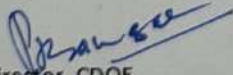
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SLM Creators

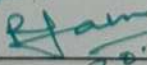
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| 2 | Social Movements in India | Dr Varsha Patel | Freelancer/Industry Expert | Outsourced |
| 3 | Sociology of Kinship, Marriage and Family | Dr. Nisha Modi | Freelancer/Industry Expert | Outsourced |
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Submitted for kind approval.


Director, CDOE

Humble Request /r
Approved
Rajni


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DEVI AHILYA VISHWAVIDYALAYA, INDORE

(Formerly University of Indore), NAAC A+ Grade

State University of Madhya Pradesh



Self-Learning Material

DIRECTORATE OF DISTANCE EDUCATION

Khandwa Road, Indore

DIRECTORATE OF DISTANCE EDUCATION

M.C.A. (ODL), 2 Year Degree Program

**Self-Learning Material
(Sample Copy)**

**Subject
Computer Networks**

**Unit- I
Fundamentals of Computer Networks**

2022

UNIT- I

Fundamentals of Computer Networks

Content

- 1.1 Learning outcomes:**
- 1.2 Introduction**
- 1.3 Evolution of Networking**
- 1.4 Uses of Computer Networking**
 - **Facilitate Communication**
 - **Resource Sharing**
 - **Centralized Support and Administration**
- 1.5 Properties of Computer Networking**
- 1.6 Basic Equipments Requirement for Networking**
- 1.7 Three Basic Networking Types**
 - **LAN - Local area network**
 - **WAN-Wide Area Network**
 - **MAN- Metropolitan Area Network**
- 1.8 The OSI Model**
- 1.9 Communication Protocols**
- 1.10 Summary**
- 1.11 Glossary**
- 1.12 FAQs**
- 1.13 Self Assessment Test**

1.1 LEARNING OUTCOMES

After a study of this e-content module the learners will be able to:

- Know about the Evolution of Computer Networking.
- Know about the Uses of Computer Networking.
- Understand the Properties of Computer Networking.
- Understand the Basic Equipment's Requirement for Networking.
- Explore the Types of Networking.

1.2 INTRODUCTION

Hello students in this lecture I will be discussing about the topic of Computer Networking. How networking of computer works, how data is shared among the connected computer using networking system. A computer network or a data network is a technology which primarily used between two devices to communicate and transfer data with each other, moreover it's also used communicate with other devices like printer and fax etc. In computer networks, networked computing devices pass data to each other along data connections. The connections between two devices / NODES are done by a cable media or wireless media. The best known example of network till date is the internet.

Network computer devices that originate, route and terminate the data are called network nodes. Nodes can include hosts such as personal computers, phones, servers as well as networking hardware. Two such devices are said to be networked together when one device is able to exchange information with the other device, whether or not they have a direct connection to each other.

Computer networks support applications such as access to the World Wide Web, shared use of application and storage servers, printers, fax machines, and use of email and instant messaging applications. Computer networks differ in the physical media used to transmit their signals, the communications

protocol to organize network traffic, the network's size, network topology and organizational intent.

1.3 EVOLUTION OF NETWORKING

Now let us know how evolution of networking took place in history of computer networking:

- In the late 1950s, early networks of communicating computers included the military radar system Semi-Automatic Ground Environment (SAGE).
- Then in 1960, the commercial airline reservation system semi-automatic business research environment (SABRE) went online with two connected mainframe computers.
- In 1962, J.C.R. Licklider developed a working group he called the "Intergalactic Computer Network", a precursor to the ARPANET, at the Advanced Research Projects Agency (ARPA).
- And 1964, researchers at Dartmouth developed the Dartmouth Time Sharing System for distributed users of large computer systems. The same year, at Massachusetts Institute of Technology (MIT), a research group supported by General Electric and Bell Labs used a computer to route and manage telephone connections.
- Throughout the 1960s, Leonard Kleinrock, Paul Baran, and Donald Davies independently developed network systems that used packets to transfer information between computers over a network.
- In year 1965, Thomas Marill and Lawrence G. Roberts created the first wide area network (WAN). This was an immediate precursor to the ARPANET, of which Roberts became program manager. And in this year the first widely used telephone switch that implemented true computer control was introduced by Western Electric.
- In 1969, the University of California at Los Angeles, the Stanford Research Institute, the University of California at Santa Barbara, and the

University of Utah were connected as the beginning of the ARPANET network using 50 Kbit/s circuits.

- Then in late 1972, commercial services using X.25 were deployed, and later used as an underlying infrastructure for expanding TCP/IP networks.
- In 1973, Robert Metcalfe wrote a formal memo at Xerox PARC describing Ethernet, a networking system that was based on the Aloha network, developed in the 1960s by Norman Abramson and colleagues at the University of Hawaii. In July 1976, Robert Metcalfe and David Boggs published their paper titled as "Ethernet: Distributed Packet Switching for Local Computer Networks" and collaborated on several patents received in 1977 and 1978. In 1979, Robert Metcalfe pursued making Ethernet an open standard.
- In 1976, John Murphy of Datapoint Corporation created ARCNET, a token-passing network first used to share storage devices.
- In 1995, the transmission speed capacity for Ethernet was increased from 10 Mbit/s to 100 Mbit/s. By 1998, Ethernet supported transmission speeds up to a Gigabit. The ability of Ethernet to scale easily (such as quickly adapting to support new fiber optic cable speeds) is a contributing factor to its continued use today. So this is how the evolution of computer networking took place and still continued today.

1.4 USES OF COMPUTER NETWORKING

Next comes the uses of computer networking:

- **Facilitate Communication**

The primary purpose of computer networking is to facilitate communication. A network allows a user to instantly connect with another user, or network, and send and receive data. It allows remote users to connect with one another via videoconferencing, virtual meetings and digital emails.

Computer networks provide access to online libraries, journals, electronic newspapers, chat rooms, social networking websites and email clients and

most importantly World Wide Web. Users can benefit from making online bookings for theaters, restaurants, hotels, trains and airplanes. They can shop and carry out banking transactions from the comfort of their homes.

Computer networks allow users to access interactive entertainment channels, such as video on demand, interactive films, interactive and live television, multiperson real-time games and virtual-reality models.

- **Resource Sharing**

Computer networks allow users to share files and resources. They are popularly used in organizations to cut costs and streamline resource sharing. A single printer attached to a small local area network (LAN) can effectively service the printing requests of all computer users on the same network. Users can similarly share other network hardware devices, such as modems, fax machines, hard drives and removable storage devices.

Networks allow users to share software applications, programs and files. They can share documents (such as invoices, spreadsheets and memos), word processing software, videos, photographs, audio files, project tracking software and other similar programs. Users can also access, retrieve and save data on the hard drive of the main network server.

- **Centralized Support and Administration**

Computer networking centralizes support, administration and network support tasks. Technical personnel manage all the nodes of the network, provide assistance, and troubleshoot network hardware and software errors. Network administrators ensure data integrity and devise systems to maintain the reliability of information through the network. They are responsible for providing high-end antivirus, anti-spyware and firewall software to the network users. Unlike a stand-alone system, a networked computer is fully managed and administered by a centralized server, which accepts all user requests and services them as required.

Today, computer networks are the core of modern communication. All modern aspects of the public switched telephone network (PSTN) are computer-controlled. Telephony increasingly runs over the Internet Protocol, although not necessarily the public Internet. The scope of communication has increased significantly in the past decade. This boom in communications would not have been possible without the progressively advancing computer network. Computer networks, and the technologies that make communication between networked computers possible, continue to drive computer hardware, software, and peripherals industries. The expansion of related industries is mirrored by growth in the numbers and types of people using networks, from the researchers to the home user.

PROPERTIES OF COMPUTER NETWORKING

Next we will learn the properties of computer networking.

Computer networking may be considered a branch of electrical engineering, telecommunications, computer sciences, information technology or computer engineering, since it relies upon the theoretical and practical application of the related disciplines.

A computer network has the following properties:

Facilitates interpersonal communications

People can communicate efficiently and easily via email, instant messaging, chat rooms, telephone, video telephone calls, and video conferencing.

Allows sharing of files, data, and other types of information

Authorized users may access information stored on other computers on the network. Providing access to information on shared storage devices is an important feature of many networks.

Allows sharing of network and computing resources

Users may access and use resources provided by devices on the network, such as printing a document on a shared network printer, uses computing resources

across a network to accomplish tasks.

May be insecure

A computer network may be used by computer Crackers to deploy computer viruses or computer worms on devices connected to the network, or to prevent these devices from accessing the network (denial of service).

May interfere with other technologies

Interference with other technologies strongly disturbs certain forms of radio communication, e.g., amateur radio. It may also interfere with access technologies such as ADSL and VDSL.

May be difficult to set up

A complex computer network may be difficult to set up. It may be costly to set up an effective computer network in a large organization.

1.6 BASIC EQUIPMENTS REQUIREMENT FOR NETWORKING

Now we will understand what all basic equipments required for networking of two or more computers.

For a basic network connection, few items are needed

- 2 or more hosts / computers or network capable devices.
- Media for connection as cable or wireless
- Network devices to connect more than 2 devices or not directly connecting devices like router.

Network devices can be connected directly which is called peer to peer connection or can be connected in a group of devices.

There are certain protocols and rules to connect and process, which is mandatory to achieve best result. To transfer data and information we need a set of rules which can be understood by all network devices. These rules are called protocols and to process the information and making it transferable on network, a process is used called OSI model.

1.7 THREE BASIC NETWORKING TYPES

Next we will study the three basic networking types

LAN - Local area network: LAN is a set or group of computer / devices. A networked office building, school, or home usually contains a single LAN, though sometimes one building will contain a few small LANs (perhaps one per room), and occasionally a LAN will span a group of nearby buildings.

WAN-Wide Area Network: Wan is a network where a PC or group of PCs connects to other network or internet .Residences typically employ one LAN and connect to the Internet WAN via an Internet Service Provider (ISP) using a broadband connection. The ISP provides a WAN IP address to the modem, and all of the computers on the home network use LAN (so-called private) IP addresses. Home network use IP addresses. All computers on the home LAN can communicate directly with each other but must go through a central gateway, typically a broadband router, to reach the ISP.

MAN- Metropolitan Area Network: MAN is a computer network in which two or more computers or communicating devices or networks which are geographically separated but in same metropolitan city and are connected to each other are said to be connected on MAN. Metropolitan limits are determined by local municipal corporations; the larger the city, the bigger the MAN, the smaller a metro city, smaller the MAN.

1.8 THE OSI MODEL

The OSI, or Open System Interconnection, model defines a networking framework to implement protocols in seven layers. Control is passed from one layer to the next, starting at the application layer in one station, and proceeding to the bottom layer, over the channel to the next station and back up the hierarchy. The OSI model doesn't do any functions in the networking process; it is a conceptual framework so we can better understand complex interactions that are happening. The OSI model takes the task of internetworking and divides that up into what is referred to as a vertical stack that consists of the following layers:

1st one is Physical layer

This layer conveys the bit stream - electrical impulses, light or radio signal through the network at the electrical and mechanical level. It provides the hardware means of sending and receiving data on a carrier, including defining cables, cards and physical aspects. Fast Ethernet, RS232, and ATM are protocols with physical layer components.

2nd is Data Link

At this layer, data packets are encoded and decoded into bits. It furnishes transmission protocol knowledge and management and handles errors in the physical layer, flow control and frame synchronization. The data link layer is divided into two sub layers: The Media Access Control (MAC) layer and the Logical Link Control (LLC) layer. The MAC sub layer controls how a computer on the network gains access to the data and permission to transmit it. The LLC layer controls frame synchronization, flow control and error checking.

- Layer 2 Data Link examples include PPP, FDDI, ATM, IEEE 802.5/ 802.2, IEEE 802.3/802.2, HDLC, Frame Relay,

Then comes the 3rd layer Network

This layer provides switching and routing technologies, creating logical paths, known as virtual circuits, for transmitting data from node to node. Routing and forwarding are functions of this layer, as well as addressing, internetworking, error handling, congestion control and packet sequencing.

- Layer 3 Network examples include AppleTalk DDP, IP and IPX.

4th is Transport layer

This layer provides transparent transfer of data between the systems, or hosts, and is responsible for end-to-end error recovery and flow control. It ensures complete data transfer.

- Layer 4 Transport examples include SPX, TCP, and UDP.

Then comes the fifth Session layer

This layer establishes, manages and terminates connections between applications. The session layer sets up, coordinates, and terminates conversations, exchanges, and dialogues between the applications at each end. It deals with session and connection coordination.

- Layer 5 Session examples include NFS, NetBIOS names, RPC, SQL.

After session layer there is Presentation Layer;

This layer provides independence from differences in data representation (e.g., encryption) by translating from application to network format, and vice versa. The presentation layer works to transform data into the form that the application layer can accept. This layer formats and encrypts data to be sent across a network, providing freedom from compatibility problems. It is sometimes called the syntax layer.

- Layer 6 Presentation examples include encryption, ASCII, EBCDIC, TIFF, GIF, PICT, JPEG, MPEG, MIDI.

And the last one is Application Layer

This layer supports application and end-user processes. Communication partners are identified, quality of service is identified, user authentication and privacy are considered, and any constraints on data syntax are identified. Everything at this layer is application-specific. This layer provides application services for file transfers, e-mail, and other network software services. Telnet and FTP (File Transfer Protocol) are applications that exist entirely in the application level. Tiered application architectures are part of this layer.

- Layer 7 Application examples include WWW browsers, NFS, SNMP, Telnet, HTTP, and FTP

1.9 COMMUNICATION PROTOCOLS

A communications protocol is a set of rules for exchanging information over network links. In a protocol stack, each protocol leverages the services of the protocol below it. An important example of a protocol stack is HTTP running

over TCP over IP over IEEE 802.11. (TCP and IP are members of the Internet Protocol Suite. IEEE 802.11 is a member of the Ethernet protocol suite.) This stack is used between the wireless router and the home user's personal computer when the user is surfing the web.

Whilst the use of protocol layering is today ubiquitous across the field of computer networking, it has been historically criticized by many researchers for two principle reasons. Firstly, abstracting the protocol stack in this way may cause a higher layer to duplicate functionality of a lower layer, a prime example being error recovery on both a per-link basis and an end-to-end basis. Secondly, it is common that a protocol implementation at one layer may require data, state or addressing information that is only present at another layer, thus defeating the point of separating the layers in the first place. For example, TCP uses the ECN field in the IPv4 header as an indication of congestion; IP is a network layer protocol whereas TCP is a transport layer protocol.

Communication protocols have various characteristics. They may be connection-oriented or connectionless, they may use circuit mode or packet switching, and they may use hierarchical addressing or flat addressing.

1.10 SUMMARY:

Users and network administrators typically have different views of their networks. Users can share printers and some servers from a workgroup, which usually means they are in the same geographic location and are on the same LAN, whereas a Network Administrator is responsible to keep that network up and running. A community of interest has less of a connection of being in a local area, and should be thought of as a set of arbitrarily located users who share a set of servers, and possibly also communicate via peer-to-peer technologies.

Network administrators can see networks from both physical and logical perspectives. The physical perspective involves geographic locations,

physical cabling, and the network elements (e.g., routers, bridges and application layer gateways) that interconnect the physical media. So today we have studied about computer networking, all about how does it emerged and what all benefits we have using computer networking. Thank you.

1.11 GLOSSARY

Network: A group of interconnected computers.

Nodes: A point in a network where lines cross or branch.

Email: The sending of electronic messages from one computer user to another.

Encode: Convert into a coded form.

Decode: Convert a coded message into understandable language.

Protocol: The accepted code of behavior in a situation

Framework: A supporting structure.

1.12 FAQs

Q1. What are the uses of Computer Networking?

Ans. Uses of Computer Networking:

- a) Facilitate Communication
- b) Resource Sharing
- c) Centralized Support and Administration

Q2. How many types of Networking exist?

Ans. There are three basic types of Networking

- a) LAN (Local Area Network)
- b) WAN (Wide Area Network)

c) MAN (Metropolitan Area Network)

Q3. Explain in brief the advantages / disadvantages of Computer Networking?

Ans. Advantages of Computer Networking:

- a) Facilitates interpersonal communications.
- b) Allows sharing of files, data, and other types of information
- c) Allows sharing of network and computing resources

Disadvantages of Computer Networking:

- a. May be insecure
- b. May interfere with other technologies
- c. May be difficult to set up

Q4. What are the basic equipments required for Networking?

Ans. For a basic network connection, few items are needed

- Two or more hosts / computers or network capable devices.
- Media for connection as cable or wireless
- Network devices to connect more than 2 devices like switch , hub and expansion devices like routers.
- An ISP (internet service provider)provided device (Modem) to connect to the internet

Q5. Explain in brief about the OSI Model?

Ans. The OSI, or Open System Interconnection, model defines a networking framework to implement protocols in seven layers. The OSI model takes the task of internetworking and divides that up into what is referred to as a vertical stack that consists of the following layers:

- a) Physical Layer
- b) Data Link
- c) Layer Network
- d) Transport Layer
- e) Session Layer
- f) Presentation Layer
- g) Application Layer

Control is passed from one layer to the next, starting at the application layer in one station, and proceeding to the bottom layer, over the channel to the next station and back up the hierarchy. The OSI model doesn't do any functions in the networking process; It is a conceptual framework so we can better understand complex interactions that are happening.

1.13 SELF ASSESSMENT TEST

Q1. In the late 1950s, early networks of communicating computers included.....

- a. ARPANET
- b. Semi-Automatic Business Research Environment (SABRE)
- c. Semi-Automatic Ground Environment (SAGE)**

Q2. Full Form of OSI.....

- a. Open System Internode
- b. Open System Interconnection**
- c. Operating System Internet

Q3. Which one is a type of Networking?

- a. WAN**
- b. Ethernet
- c. Data Link

Q4. What would you call a set of rules for exchanging information over network links?

- a. Communication Protocols**
- b. Nodes
- c. Internet

Q5. When two or more computers or communicating devices or networks are geographically separated but are in the same metropolitan city and are connected to each other then they are said to use which type of network?

- a. LAN
- b. MAN**
- c. WAN

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**Unit- I
Reserve Bank of India and its Objectives**

2022

UNIT- I

Reserve Bank of India and its Objectives

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1.1 LEARNING OUTCOMES

Few of the important outcomes of this module are

- Explain and discuss the need and origin of the RBI.
- Analyzing the organizational structure of RBI.
- Indicating the list of RBI Governors since Liberalization.
- Illustrating the working of the monetary policy.
- Describing the working of Monetary Policy Committee.
- Understanding the role and functioning of RBI

1.2 Introduction to RBI

- The central bank is the prime institution of the monetary system which seeks to regulate the working of the commercial banks of a country.
- RBI was set up based on the *Hilton Young Commission* Recommendation in *April 1935* with the enactment of the *RBI Act, 1934*.
- The head-quarter of RBI was initially established in *Kolkata* and further moved to *Mumbai* in the year *1937*.
- It has 22 regional offices, of which most of them are situated in the state capital.
- The administrative head of the RBI is called the Governor, Deputy Governors, and other executive officers assist in the administration of the bank.
- The first Governor of the RBI was *Sir Osborne Smith*.
- RBI was nationalized in 1949 and its first Indian Governor was *Chintaman D Deshmukh*. At present *Shaktikant Das* is the present Governor of RBI.

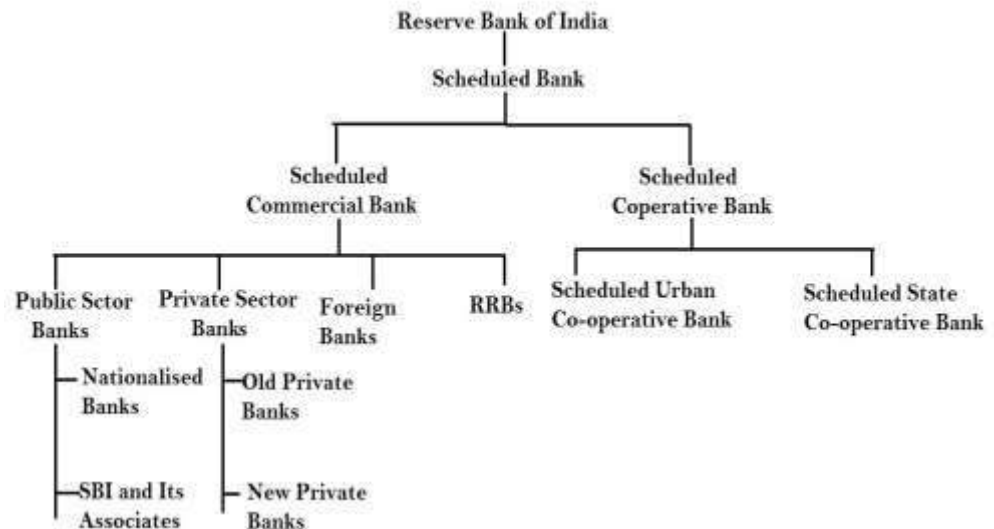
1.3 Preamble of RBI

Reserve Bank of India describes in its preamble the basic functions of the Reserve Bank as:

“...to regulate the issue of Banknotes and keeping of reserves with a view to securing monetary stability in India and generally to operate the currency and credit system of the country to its advantage; to have a modern monetary policy framework to meet the challenge of an increasingly complex economy, to maintain price stability while keeping in mind the objective of growth.”

Source: [Reserve Bank of India - About Us \(rbi.org.in\)](http://rbi.org.in)

1.4 Structure of Banking in India



1.5 Organization hierarchy of RBI

- The Central Board of Directors is the primary committee of RBI. The government of India appoints the director for a four year period.
 - The board consists of a Governor and not more than four Deputy Governor, four directors to represent a regional board, two from the Ministry of Finance, and ten other directors from various fields.
 - The commercial banks are headed by the Governor, and the post is currently held by Shri Shaktikant Das.
 - There are 4 Deputy Governors, including Shri M.K Jain, M.D Patra, M.R Rao, and Shri T Rabi Shankar
1. Governor
 2. Deputy Governor
 3. Executive Directors
 4. Principal Chief General Manager
 5. Chief General Manager
 6. Managers
 7. Assistant Managers
 8. Support staff

1.6 Present Organizational Structure of RBI

Governor

- Shri Shaktikanta Das

Deputy Governors

- Shri M K Jain
- Dr. M D Patra
- Shri S M Rao
- Shri T Rabi Shankar

1.7 List of RBI Governors since the adoption of LPG

- S. Venkitaramana - 22 December 1990 to 21 December 1992
- C. Rangarajan- 22 December 1992 to 21 November 1997
- Bimal Jalan- 22 November 1997 to 6 September 2003
- Y. Venugopal Reddy- 6 September 2003 to 5 September 2008
- Subbarao- 5 September 2008 to 4 September 2013
- Raghuram Rajan- 4 September 2013 to 4 September 2016
- Urjit Patel- 4 September 2016 to 10 December 2018
- Shaktikanta Das- 12 December 2018 Incumbent

1.8 Important Events of RBI (Adoption of LPG)

- Prior to Liberalization, RBI used to control the financial sector, including financial institutions, commercial banks, investment banks, stock exchange operations, and foreign exchange markets. Economic liberalization and financial sector reforms shifted the role of RBI from the controller to facilitator.

- At the time of appointment of S. Venkitaramana, as RBI Governor, India was through a balance of payments crisis, with fast-depleting foreign exchange reserves. His decisive actions helped India tide over the crisis.
- During his tenure as RBI Governor, the notorious *Harshad Mehta* scam was exposed by Sucheta Dalal.

Important Events of RBI (DEMONETIZATION)

- On 08/11/2016, the Indian Government announced the demonetization of all ₹ 500 and ₹ 1,000 banknotes of the Mahatma Gandhi Series.
- On 9th Nov 2016, India lost 86 % of its monetary base.
- RBI asked to maintain an incremental Cash Reserve Ratio of 100% to absorb excess liquidity.

Important Events of RBI (COVID 19 Pandemic)

Stating the coronavirus COVID-19 pandemic an "unprecedented threat and invisible assassin", the RBI on Friday (27/03/2020) cut the Repo Rate by 75 basis points to 4.4 percent and reduced Reverse Repo Rate by 90 basis points to 4 percent as part of measures to ease the pain on banks and industries which are suffering from the 21-day lockdown.

1.9 Monetary Policy Committee(MPC)

- It is a committee composed by the RBI and headed by the Governor of RBI.
- MPC was formed with the mission of fixing the benchmark policy interest rate (repo rate) to restrain inflation within the target level.
- At the outset, the major decisions relating to interest rates were taken by the Governor of RBI alone before the formation of the committee.
- MPC was constituted under the RBI Act, 1934, as an initiative to bring more transparency and accountability in securing the Monetary Policy of India.

- MPC conducts meetings at least six times (bi-monthly) a year, and the monetary policy is published after every meeting where each member explains his opinions.

1.10 Objectives and Functions of RBI

- Controlling the issue of currency in India
- Keeping the Forex reserves of the country.
- Lender of Last Resort.
- Banker's Bank
- Agent of the Government
- establishing the monetary stability in the country
- Credit Control

1.11 Issue of Notes and Coins

- RBI has sole right to issue currency notes of all denominations except one-rupee coins and notes which are issued by the Ministry of Finance, Under section 22 of the RBI Act,
- Currency notes issued by the RBI are declared unlimited legal tender throughout the country.
- The Indian Currency System
- The current monetary system of India is based on inconvertible paper currency and is managed by the RBI.
- The present currency system is based on a minimum reserve system of note issue.
- It was adopted in 1957 under a minimum reserve system, minimum of gold and foreign securities to the extent of ₹ 200 crores (Of which gold should be of value ₹ 115 crores), and the balance in rupee securities maintained.

1.12 Printing of Securities and Minting on India

| Security Press | Station | Related by |
|---------------------------------------|-----------------------|--------------------------------------|
| Currency Note Press (1928) | Nasik | Banknotes from Re.1 to Rs. 100. |
| Security paper (1967-68) | Hoshangabad | Banks and currency notes paper. |
| Bank Note Press (1974) | Dewas | Banknotes of Rs. 20,50,100 and 500 |
| Security Notes Printing Press (1982) | Hyderabad | Union excise duty stamps. |
| India Security Press Nasik (1992) | Mysore (Karnataka) | Postal material, postal stamps, etc. |
| Modernized Currency Note Press (1995) | Salbani (West Bengal) | |

Coins are minted at four places viz. Mumbai, Kolkata, Hyderabad, and Noida.

1.13 Issue of Notes and Coins

This focus of notes issue function with the RBI has several advantages:

- it brings uniformity in notes issue
- it is easier to control and regulate credit in accordance with the requirements of the economy
- it makes possible effective state supervision
- it keeps the faith of the public in the paper currency.

1.14 Regulation of Forex

- The RBI is the custodian of India's foreign exchange reserves. It maintains and stabilizes the external value of the rupee, manages exchange controls and other restrictions enforced by the government, and manages the foreign exchange reserves (FOREX).
- Initially, the stability of the exchange rate was maintained through selling and buying sterling at fixed rates.
- However, after Indian membership at International Monetary Fund (IMF) in 1947, the rupee was delinked with sterling and became a multilaterally convertible currency.
- Therefore, the RBI now sells and buys foreign currencies, and not sterling alone, so as to achieve the objective of exchange stability.
- The RBI fixes the buying and selling rates of foreign currencies. All foreign remittances to India and Indian remittances to foreign countries are made through the RBI.

1.15 Banker to the Government

The RBI acts as the banker, agent, and adviser to the Government of India. It has an commitment to transact the banking business of the Central government as well as state government.

It retains and operates government deposits.

- It accumulates and makes payments on behalf of the government.
- It supports the government to float new loans and manages the public debt.
- It offers for the 91 days duration, Central Government treasury bills.
- It makes 'Ways and Means' advances to the State and Central Governments for periods not exceeding three months.
- It offers development finance to the government for carrying out five-year plans.

- It accepts foreign exchange transactions on behalf of the Central Government.
- It acts as the agent of the Government of India in the latter's dealings with the World Bank, the International Monetary Fund (IMF), and other international financial institutions.
- It advises the government on all financial matters such as loan operations, investments, agricultural and industrial finance, banking, planning, economic development, etc.

1.16 Lender of Last Resort

- RBI acts as a lender of last resort. It gives funds to the bank when they fail to get it from other sources. It also acts as a clearing house.
- The commercial banks approach the RBI in times of emergency to rush over financial difficulties, and the RBI comes to their rescue though it might charge a higher rate of interest.
- The RBI gives financial assistance to commercial banks and State cooperative banks through rediscounting of bills of exchange as the RBI meets the needs of the commercial banks and cooperative banks, the RBI functions as the 'lender of the last resort.

1.17 Bankers Bank

As a regulator and supervisor of the country's financial system, the RBI prescribes the broad parameters of banking operations within which the entire banking and financial system operate in the country.

The main purpose of this activity of the RBI is to

- a) uphold public confidence in the nation's banking system,
- b) safeguard the interests of depositors, and
- c) deliver cost-effective banking services to the public.

As a bankers' bank, the it takes a part of the cash reserves of commercial banks and offers them funds for short periods.

The RBI has been authorized by law to regulate, supervise, and control the activities of commercial and cooperative banks. The RBI periodically inspects banks and asks them for returns and necessary information.

1.18 Controller of Money Supply and Credit

Due to economic fluctuations, the central bank controls the money supply and credit in the best interests of the economy.

Need for credit control

- To encourage overall growth of the priority sector.
- To hold a check over the channelization of credit.
- To accomplish the goal of controlling inflation as well as deflation.
- To enhance the economy by facilitating the flow of adequate volume of bank credit to different sectors.
- Stability in the exchange rate and money market of the country.

1.19 Summary:

The Module is designed to provide the students with a thorough understanding of the importance of the Central Banking system in various economies. It intends to provide the students with an introduction to understanding the origin of RBI, its organizational structure, Important Events, and major decisions of RBI which affected the Indian Economy and Monetary Policies adopted by RBI. It provides an insight into the Central Banking system.

1.20 Glossary

Monetary Policy Committee(MPC):

It is a committee formed by the Reserve Bank of India and led by the Governor of RBI. MPC was formed with the aim of fixing the benchmark policy interest rate (repo rate) to restrain inflation within the target level.

Repo Rate: It is the interest rate that the RBI charges when commercial banks borrow money from it for short term.

Reverse repo rate: It is the interest rate that the RBI pays commercial banks when they park their excess cash with the it.

Foreign exchange reserves (FOREX): It is a global market for exchanging national currencies with one other economies.

Credit control: It is an essential tool used by the RBI, a major weapon of the monetary policy which is used to control the demand and supply of money, i.e., liquidity in the economy.

1.21 FAQ

1. Which bank is called the Apex Bank of India?

Ans. The Reserve Bank of India (RBI) is India's Apex bank, also known as the banker's bank and Central Bank. The RBI regulates the monetary and other banking policies of the Indian government. The RBI was established on April 1, 1935, in accordance with the Reserve Bank of India Act, 1934.

2. What is the old name of the Reserve Bank of India?

Ans. In 1921, the Imperial Bank of India was set up to proceed as the national bank of India by the British Government.

3. Who controls the Reserve Bank of India?

Ans. The Government of India controls the RBI. Although originally privately owned, since nationalization in 1949, the Reserve Bank has been fully owned by the Government of India.

4. When did RBI Nationalise?

Ans. The RBI was nationalized with effect from 1st January 1949 on the basis of the Reserve Bank of India (Transfer to Public Ownership) Act, 1948. All shares in the capital of the Bank were deemed transferred to the Central Government on payment of suitable compensation.

5. Who appoints RBI Governor?

Ans. The Central Government appoints RBI Governor. The Deputy Governors are also appointed by the Central Government. Their names are approved by Cabinet Committee on appointments.

6. What are the objectives of the RBI?

Ans. The main goals of the RBI, according to the Preamble, are as follows.

- To regulate the issue of Banknotes.
- To secure monetary stability in the country.
- To meet the economic challenges by modernizing the monetary policy framework.

7. What are the basic functions of the Reserve bank as per the preamble of the Reserve Bank of India?

Ans. The basic functions of the Reserve bank as per the Preamble of the Reserve Bank of India are as follows:

- Controlling the issue of currency in India
- keeping the foreign exchange reserves of the country.
- Lender of Last Resort.
- Banker's Bank
- Agent of the Government
- Establishing the monetary stability in the country
- Credit Control

8. What is the Narasimhan Committee report?

Ans. The Narasimha-II Committee was given the task of the progress review of the implementation of the banking reforms since 1992. The aim was further strengthening the financial institutions of India. It focussed on issues like the size of banks and capital adequacy ratio, among other things.

1.22 Self Assessment Test

1. Who is the present RBI Governor?
 - a. **Shaktikant Das**
 - b. Raghuram Rajan
 - c. C. Rangarajan
 - d. Urijit Patel

2. What is the minimum limit of Cash Reserve Ratio(CRR) that can be set by the RBI?
 - a. No Limit
 - b. 12%
 - c. 15%
 - d. **20%**

3. Who maintains the current account of all other banks ?
 - a. Finance Ministry
 - b. **RBI**
 - c. World Bank
 - d. State Bank of India

4. Which of the following functions are accomplished by RBI as a banker of banks?
 - a. settlements of inter-bank transactions
 - b. Enables banks to provide their accounts with RBI for statutory reserve requirements.
 - c. acts as the lender of last resort
 - d. **All of the above**

5. Who is the custodian of India's foreign exchange reserve?

- a. Department of Finance
 - b. State Bank of India
 - c. **Reserve Bank of India**
 - d. Board of Financial Supervision
6. The Reserve Bank of India was established on _____.
- a. **April 1, 1935**
 - b. July 12, 1982
 - c. May 26, 2006
 - d. September 30, 2005
7. The first Indian Governor of RBI after Nationalization was?
- a. C. Rangarajan
 - b. **Chintaman D Deshmukh**
 - c. Pt. Jawahar Lal Nehru
 - d. Bimal Jalan
8. The Indian Government announced the demonetization of all ₹ 500 and ₹1,000 banknotes of the Mahatma Gandhi Series on
- a. November 8, 2017
 - b. **November 8, 2016**
 - c. December 8, 2016
 - d. October 8, 2017
9. Governor of the RBI is appointed by?
- a. President of India
 - b. Prime Minister of India
 - c. **Central Government**
 - d. Vice President of India

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2020

UNIT- I

The Multidisciplinary Nature of Environment

TOPIC

The Multidisciplinary Nature of Environment: Definition, Scope and Importance

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- 1.2 Introduction**
- 1.3 Scope and Importance**
- 1.4 Multidisciplinary Nature of Environment**
- 1.5 Awareness about the environment**
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- 1.6 At world level the following programs have been started by men**
- 1.7 Program regarding Environmental Awareness at the level of Governmental and Non- Governmental Organizations**
- 1.8 Summary**
- 1.9 Glossary**
- 1.10 FAQs**
- 1.11 Self Assessment Test**
- 1.12 Assignments**

1.1 Learning Outcomes

After going through this Module the student will be able: -

- To define the term Environment and to find out its importance in the life of various organisms including Human beings.
- To give an idea regarding the scope and multidisciplinary approach of the Environment.
- To develop awareness regarding environment and efforts made in this direction till today.

1.2 Introduction:

Every organism is the outcome of two factors: Heredity and Environment. Heredity is contributed by the parents' while Environment is the contribution of Nature. The importance of Environmental studies was felt in 1970, due to the origin of Pollution problems. It was also realized that Public awareness is necessary regarding the protection of Environment that is why the UGC introduced Environment as a subject not only for the Students of Science, but also for the students of Arts and Commerce throughout India. Out of 9 planets around the Sun, the Earth is the only planet where life exists. All organisms along with Earth and Atmosphere form Biosphere. Environment is the base for the origin and evolution of Life. Dinosaurs which dominated the Earth in Mesozoic Era (6 Million years back) were fossilized due to unfavorable Environment.

The word Environment has two parts: Environ= surroundings; ment = result of. It means everything that surrounds an organism. Thus, Environment is the sum total of living and non-living components, influences and events surrounding an Organism. According to Tansley, sum total of all effective factors in which an organism lives is, Environment.

The moment we utter the word Environment, we feel the presence of Soil, water, mountains, ponds, deserts, etc. We are also reminded of Climatic factors like temperatures, Humidity, Rainfall etc. Thus, Environment means the summation of Living (Biotic); Non-living (Abiotic) factors on an organism.

1.3 Scope and Importance:

The scope of Environment is very wide. It includes the study of Atmosphere, troposphere and Hydrosphere. Innumerable microbes which are not visible to us are also a part of Environment. Judicious Utilization of natural resources like Soil, water and minerals is also a part of Environment. To avoid destruction in the name of development is also a part of study of the Environment. Natural hazards such as Volcanoes and Earthquake disturb the balance of Nature. Multi disciplinary natured Environmental studies are connected with several other subjects.

1.4 Multidisciplinary Nature of Environment:

Green plants are the primary producers. They produce food by using Carbon dioxide and Water. Sunlight is source of energy. Every green leaf is a solar cooker. The process of food manufacture is called Photosynthesis. Oxygen is produced which is vital for all organisms. The food produced by the green plants not only supports the plants, but also the animals. All animals are consumers. The green plants are the basis of the entire living world; hence study of botany is connected with the environment.

Animals are an important component of the Environment. They can be carnivorous or Herbivorous. The balance of Animals in Biosphere is important for the overall balance of the Environment. Man is a omnivorous animal and presently, is considered to be the most dangerous, he has disturbed the balance of Environment. Man cuts the Forests, converts them to Agricultural land, and thereafter, Agricultural land to residential colonies. Multistoried buildings are concrete jungles which are replacing the Natural jungles. It is due to the mistake of man that foreign weeds like Carrot weed have entered from Mexico. Thus study of Environment is connected with Human Activities also.

Chemical structure of Soil, water and gases in air, Acid rains, Ozone layers' depletion, and study of Green House gases is studied under chemistry. This study is also connected with Environment issues.

Light, heat, radioactivity and noise pollution are covered in the discipline of Physics. They also affect the Environment.

Minerals are obtained from the Earth by digging very deep. Digging results in Earthquake, which disturbs the Environment. Hence, Geology and Environment are also inter-disciplinary.

Latitude, longitude, height from Mean Sea level affects the vegetation as well as animals, and ultimately the Environment. Thus, Geography and Environment are also inter related.

Man is becoming the enemy of Environment. To protect the Environment, legislative measures are to be implemented, so law studies get connected to the Environment.

1.5 Awareness about the environment:

It is needless to say that the very existence of the man depends upon the balance of Environment industrialization and economic problem have taken place at the cost of degradation of Environment. Poverty, population and pollution are the common problem faced by developing countries like India. Pure air and pure water are luxury for big cities. One has to pay a high price of these kids of nature. It was there to realize by the world to create an awareness regarding the Environment. UNO organized a conference on Environment at stockhome on 5th June, 1972. Smt. Indira Gandhi, the then prime minister of India considered poverty as the biggest pollutant of Environmental balance.

In the memory of this conference 5th June is observed as the World Environment Day every Year. On this day Radio, News papers and Television focus their attention on Environmental problems. Bhopal gas tragedy due to leakage of MIC (Methyl Iso- Cynate) from union carbide resulted the death of 2500 people and about 1 lacks suffering today from chest problems and the eye problems. Justice Krishna Iyer called this tragedy "BHOPOSIMA" on the lines of the atomic bomb explosion in Hiroshima. This is the biggest air pollution tragedy of the world. In 1986 an explosion took place in the

nuclear power plant in Chernobyl in Russia, about one million people were affected and this power plant was closed down.

Water of several rivers is polluted due to factory waste. Water of hand pumps contains arsenic and furiods beyond the standards and limits. It has toxic effects. It is therefore necessary to create awareness about the Environmental in common man. Govt. of India started ministry of Environment and also passed forest act in 1972. Govt. of Madhya Pradesh implemented the forest act in 1974. The parliament has added articles 48A and 51A in the constitution.

A. Article 48A: It is the duty of the State Government to protect and improve the Environment. The Govt. has to protect the forest and the wildlife.

B. Article 51A: it is the responsibility of every Indian citizen to protect the natural Environment, which Includes forest, lakes, rivers and wildlife. Every Indian Citizen should have Compassion for living creature.

1.6 At world level the following programs have been started by men:

1. International biological Program
2. "Man and biosphere program" started in 1970 by UNESCO.
3. Stockholm conference from 5th to 16th June 1972.
4. International Geo-sphere Biological Program (1986).
5. Earth Summit – Reode jenerio (Brazil) 1992
6. World Conference on Natural Disaster, Yokohame, Japan 1996
7. Kyoto Protocol - Kyoto, Japan – 1997
8. World Conference on sustainable development in Johannesburg, South Affrica, 2001
9. The World Conference on Global Warming, Bali (Indonesia), 2007

1.7 Program regarding Environmental Awareness at the level of Governmental and Non- Governmental Organizations:

1. Animal welfare fortnight from 14th January.
2. World Forest Day - 21 January
3. World Environment Day – 5th June
4. World Animal Day – 3rd October
5. World Habitat Day – 4TH October
6. World Wildlife Week from Monday of the first week of October.
7. The World Conservation Day - 3rd December.

Started by the then minister honorable K.M. Munshi in India from 1950. In the month of July and February, plantation is done by the Forest department.

Started by Shri Chandi Prasad Bhatt of Tehri Garhwal (Uttaranchal) from 1973 onwards this was followed by Shri Sunderlal Bahuguna of Gopeshwar in Chamli District of Uttaranchal. Whenever any contractor of Govt. agency tries to fall trees, village people hug the trees to save them.

On the lines of Chipko Movement, Shri Pandurang Hegde has started Appiko Movement in South. It is due to this movement that the Silent Valley of Kerela could be saved from the destruction of Natural vegetation.

This program was started in Gujarat in 1974. Its aim is to establish connection between Society and Plantation.

- It will not be out of the way to mention a Chinese saying: If you are planning for one year, grow a rice plant,
- If you are planning for ten years, grow a tree, but
- If you are planning for hundred years, then create awareness in Man.

1.8 Summary

Environment means everything living as well as non-living, which surrounds man. Ancient human being was more close to the environment. As civilization advanced, man started disturbing the environment due to his selfish attitude. Industrialization, urbanization and pollution have badly disturbed the natural environment.

Poverty, pollution and population explosion are the burning problems of all developing countries like India, China, Sri Lanka and countries of Africa. Environment is a multi-disciplinary subject, having roots in Botany, zoology, Chemistry, Physics, Geography, Geology and Law, while the fruits are protection of nature, including the human being.

Efforts to create awareness regarding the environments started in 1972, when a World Conference was held at Stockholm. Later on several more conferences have been organized at different places. Kyoto Protocol and Montreal Protocol have been signed by several countries to reduce the emission of green house gases (Kyoto Protocol – 1997) and to protect the ozone layer (Montreal Protocol 1987).

Let us hope that various efforts regarding awareness may go a long way to protect the environment and add to the well being of man.

1.9 GLOSSARY

| | |
|---------------------|--|
| Environment | : Surrounding Objects. |
| Heredity | : Transmission of Parental Character. |
| Pollution | : Act of making Dirty. |
| Planet | : Heavenly body revolving around the Sun. |
| Biosphere | : Earth atmosphere along with living plants and animals. |
| Dinosuars | : Huge animals of Reptile group whichever fossilised. |
| Hurricane | : Violent Stream. |
| Photosynthesis | : The process of manufacture of food by green plants. |
| Vital | : Living. |
| Herbivore | : Animals which feed upon vegetation. |
| Carnivore | : Flesh eating animals. |
| Omnivores | : Which can eat vegetation as well as flesh. |
| Acid rain | : Raining of Acidic water. |
| Degradation | : Reduction in the quality. |
| Nuclear Power Plant | : Power house in which Electricity is obtained from Radioactive U 235. |
| Compassion | : Feeling of Pity. |
| Protocol | : Treaty. |
| Hug | : Cling to. |
| Sustainable | : Balanced. |
| Silent Valley | : Natural forest of Kerala which became silent due to the plight of singing birds as the trees were cut. |

1.10 FAQs

Qus: Out of nine planets around sun, on which planet the life exists?

Ans: Earth.

Qus: Define environment?

Ans: Sumtotal of biotic and abiotic components, influences and events surrounding an organism is called environment.

Qus: What is the scope of environment?

Ans: It deals with the study of atmosphere, visible and invisible organisms, natural resources as well as natural hazards.

Qus: How study of atmosphere is of multidisciplinary in nature?

Ans: Environmental studies involve the study of botany, zoology, physics, chemistry, geology and even law.

Qus: What are three burning problems of developing countries?

Ans: a. population

b. poverty

c. pollution

Qus: List two aspects connected with the evolution of an organism?

Ans: a. heredity

b. environment

Qus: What is biosphere?

Ans: Plants, atmosphere and animals of earth make biosphere.

Qus: Which era is called as the age of dinosaurs?

Ans: Mesozoic.

Qus: List three important components of environment?

Ans: 1. biotic 2. abiotic 3. climatic factors.

Qus: Name 5 natural resources.

Ans: 1. soil 2. water 3. minerals 4. wildlife 5. forest

Qus: List 6 natural hazards.

Ans: 1. earth quacks 2. floods 3. tsunamis 4. volcanoes 5. drought 6. droughts

Qus: How environmental studies are multidisciplinary?

Ans: Environmental studies involve the basic knowledge of botany zoology chemistry physics geology and even law.

Qus: What is the name for multi story buildings as for environmental studies?

Ans: Cement concrete jungles.

Qus: List 3 burning problems of world which are disturbing the balance of environment.

Ans: 1. global warming 2. ozone layer depletion 3. acid rains

Qus: At which place the first conference on environment was held?

Ans: At Stockholm on 5th June 1972.

Qus: What was the cause of Bhopal gas tragedy?

Ans: Leakage of MIC (methyl isocyanate) gas from union carbide factory.

Qus: What was the cause of chernobyl disaster?

Ans: Explosion in nuclear power plant.

Qus: When was forest act passed in India?

Ans: 1972

Qus: When was first Earth Summit organized?

Ans: In 1992 at Reo de Jenerio (Brazil).

Qus: Which programme was started by UNESCO regarding the protection of environment?

Ans: M.A.B (man and Biosphere) in 1970.

Qus: What was the aim of Kycto protocol?

Ans: To reduce the emission of green house gases.

Qus: What was the aim of the world conference organised at Johannesburg in 2001?

Ans: sustainable development.

Qus: Where was world conference on global warming held?

Ans: At Bali (indonesia) in 2007.

Qus: Which date is observed as world environment day?

Ans: 5th june every year.

Qus: Who started van mahotsava?

Ans: Honourable minister shri K.M. Munshi.

Qus: Who launched chipko movement in india?

Ans: Shri chandi prasad bhatt followed by shri sunderlal bahuguna.

Qus: Who has launched appiko movement in south india?

Ans: Shri pandurang hegde.

Qus: Where is silent valley situated?

Ans: In kerala.

Qus: When was social forestry programme started in india?

Ans: In 1974.

Qus: Which state in india is leading in social forestry programme?

Ans: Gujrat.

1.11 Self Assessment Test

1. Every organism is an outcome of:

- a. heredity
- b. environment
- c. both a and b
- d. none of the above

Ans. c

2. The following planet has life:

- a. earth
- b. venus
- c. jupiter
- d. Saturn

Ans. a

3. Environment has following components:

- a. Biotic
- b. abiotic
- c. climatic factors
- d. all

Ans. d

4. The following is popularly known as the age of dinosaurs:

- a. paleozoic
- b. mesozoic
- c. coenozoic
- d. none of the above

Ans. b

5. Natural hazards include

- a. earth quakes
- b. floods
- c. forest fires
- d. all

Ans. d

6. The following are natural resources:

- a. soil
- b. water
- c. minerals
- d. all the above

Ans. d

7. The following are climatic factors:

- a. Humidity
- b. rainfall
- c. temperature
- d. all

Ans. d

8. Environmental studies are connected with:

- a. botany
- b. zoology
- c. geography
- d. all

Ans. d

9. The most dangerous animal for environment is:

- a. tiger
- b. poisonous snake
- c. elephant
- d. man

Ans. d

10. World environment day is observed on:

- a. 5th June
- b. 6th June
- c. 1st December
- d. 1st January

Ans. d

11. Bhopal gas tragedy occurred on:

- a. 3rd Dec, 1984
- b. 3rd Dec, 1986
- c. 3rd Dec, 1990
- d. 3rd Dec, 1994

Ans. a

12. The cause of Bhopal gas tragedy was:

- a. methyl isocyanide gas
- b. methyl isocyanate gas
- c. carbon dioxide gas
- d. sulphur dioxide

Ans. b

1.12 ASSIGNMENTS

- a. The Students be taken to some forest, lake and mortuaries areas to convey them the idea of Environment.
- b. They should also be shown oxygen bubbles coming out in lake or pond where green plants are present. This conveys the idea of photosynthesis.
- c. They may be told that the food habits of all other animals are fixed that means they are either herbivores or carnivores but may be omnivore and most dangerous in ecosystem.
- d. The students may be taken satellite townships near Indore where agricultural lands have been converted to skyscrapers or cement concrete jungles.
- e. The students may be shown luxuriant growth of carrot weed near domestic areas as well as agricultural fields. This weed has been introduced in India from Mexico due to carelessness of man and has become nuisance for man himself.
- f. The students may be also acquainted with the multidisciplinary approach of environment because at is connected with Botany, Zoology, Chemistry, Geology and physics.
- g. Through photographs of Shri Chandi Prasad bhatta, Shri sundarlal Bahuguna they can be given the idea of “Chipko” movement.

DEVI AHILYA VISHWAVIDYALAYA, INDORE

(Formerly University of Indore), NAAC A+ Grade

State University of Madhya Pradesh



Self-Learning Material

DIRECTORATE OF DISTANCE EDUCATION

Khandwa Road, Indore

DIRECTORATE OF DISTANCE EDUCATION

M.B.A. (EM) (ODL), 2 Year Degree Program

**Self-Learning Material
(Sample Copy)**

**Subject
Wind Energy**

**Unit- I
Introduction of Wind Energy**

2020

Unit- I

Introduction of Wind Energy

Content

- 1.1 **Learning outcomes:**
- 1.2 Wind Recourses
- 1.3 Wind Potential
- 1.4 State wise Wind Power Potential in India
- 1.5 Nature of Wind:
- 1.6 Turbulence Wind:
- 1.7 Extreme Wind Speed:
- 1.8 Wind-speed Prediction and Forecasting
- 1.9 Techniques for wind resource assessment:
- 1.10 The Daily Wind Cycle
- 1.11 Wind Speed Prediction:
- 1.12 Topographic Effect on Wind:
 - a. Roughness:
 - b. Orography:
 - c. Obstacles:
 - d. Height:
- 1.13 Wind Resource Assessment:
- 1.14 How wind speeds vary with height?
- 1.15 Wind Energy Scenario in India & World
- 1.16 Basic principle of wind energy Conservation
- 1.17 Characteristics of wind Power
- 1.18 Site Selection for Wind Power
- 1.19 Advantages and Disadvantages of Wind Energy
- 1.20 Suggested readings**

1.1 Learning outcomes:

- The unit is aimed at helping you to know Scenario of Wind energy in globally as well in India.
- After going through this unit you should be able to: analyze the Potential of Wind Energy in Indian state and its contribution towards the power requirement of the country.
- Unit also help to know the limitation of the technology and able to take proper decision that at what conditions wind energy should be installed for power generation.

1.2 Wind Recourses

Air in motion is called wind. It is generated due to contrast in temperature cause pressure difference. Energy drive from wind velocity is wind energy. It can be used as a potential source of energy, which could be obtained with the help of wind mill.

One of the basic principles of wind is that the air in the atmosphere flows from high - pressure zone to low- pressure zone or from low- temperature zone to high- temperature zone. Such a circulation of wind is called the wind system. Surface winds are a result of uneven heating of the earth's surface by solar radiation. The solar radiation absorbed by the earth's surface varies with latitude – it is maximum at the equator and minimum at the poles. This creates pressure gradient in the atmosphere and resulting pressure gradient force cause air movement from high - pressure zone to low- pressure zone. Earth's rotation, its surface characteristics, seasons, continents, ocean and mountains also effect fairly on surface wind.

1.3 Wind Potential

In order for a wind energy system to be feasible there must be an adequate wind supply. A wind energy system usually requires an average annual wind speed of at least 15 km/h (4.17m/sec). Table 1 represents a guideline

of different wind speeds and their potential in producing electricity. However due to continuous progress in technology, a small capacity wind energy system could be operated even the wind speed is 2.5 m/sec.

Table1: Suitable wind velocity for Wind Power Generation

| Sr. No. | Average wind Speed, km/h | Suitability |
|---------|--------------------------|-------------|
| 1 | Up to 15 (4.17m/sec). | No good |
| 2 | Up to 18 | Poor |
| 3 | Up to 22 | Moderate |
| 4 | Up to 25 | Good |
| 5 | Up to 29 | Excellent |

Wind is simply air in motion. It is caused by the uneven heating of the Earth's surface by the sun (Fig.1). Because the Earth's surface is made of very different types of land and water, it absorbs the sun's heat at different rates. One example of this uneven heating can be found in the daily wind cycle.

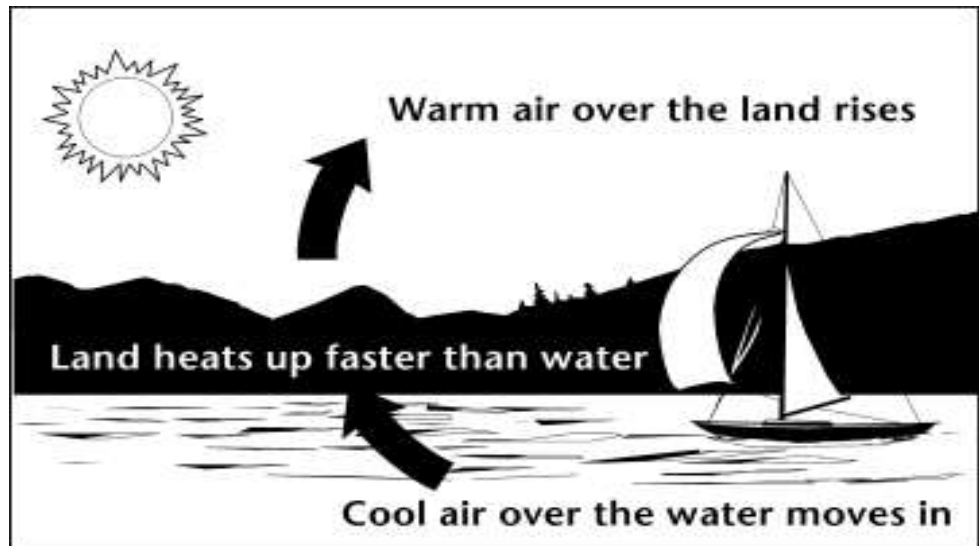


Fig. 1: Generation of wind

1.4 State wise Wind Power Potential in India

Potential of Wind energy varied from state to state. Apart from it also varied from height of installation of wind mill (Table 2).

Table 1A: Wind energy Potential at 50 & 80m height of wind mill installation

| Sr. | States / UTs | Indicative Installable Potential (MW) | | | |
|-----|--------------------|---------------------------------------|-----------------|-----------------|----------------|
| | | @ 50m | @ 80 m | @ 100 m | @ 120 m |
| 1 | Andaman & Nicobar | 2 | 365 | 8 | - |
| 2 | Andhra Pradesh | 5394 | 14497 | 44229 | 74900 |
| 3 | Arunachal Pradesh* | 201 | 236 | - | |
| 4 | Assam* | 53 | 112 | - | |
| 5 | Bihar | - | 144 | - | |
| 6 | Chhattisgarh* | 23 | 314 | 77 | |
| 7 | Daman & Diu | - | 4 | - | |
| 8 | Gujarat | 10609 | 35071 | 84431 | 142560 |
| 9 | Goa | - | - | 1 | |
| 10 | Haryana | - | 93 | - | |
| 11 | Himachal Pradesh* | 20 | 64 | - | |
| 12 | Jharkhand | - | 91 | - | |
| 13 | Jammu & Kashmir * | 5311 | 5685 | - | |
| 14 | Karnataka | 8591 | 13593 | 55857 | 124150 |
| 15 | Kerala | 790 | 837 | 1700 | |
| 16 | Lakshadweep | 16 | 16 | 8 | |
| 17 | Madhya Pradesh | 920 | 2931 | 10484 | 15400 |
| 18 | Maharashtra | 5439 | 5961 | 45394 | 98210 |
| 19 | Manipur* | 7 | 56 | - | |
| 20 | Meghalaya * | 44 | 82 | - | |
| 21 | Nagaland * | 3 | 16 | - | |
| 22 | Odisha | 910 | 1384 | 3093 | |
| 23 | Puducherry | - | 120 | 153 | |
| 24 | Rajasthan | 5005 | 5050 | 18770 | 127750 |
| 25 | Sikkim * | 98 | 98 | - | |
| 26 | Tamil Nadu | 5374 | 14152 | 33800 | 68750 |
| 27 | Telangana | - | - | 4244 | |
| 28 | Uttarakhand * | 161 | 534 | - | |
| 29 | Uttar Pradesh * | 137 | 1260 | - | |
| 30 | West Bengal* | 22 | 22 | 2 | |
| | Total | 49,130 | 1,02,788 | 3,02,251 | 695500# |

Although up to 120 m height, Indian has potential to install about 695500MW Power plant based on wind energy, however limitation of technology, installation cost, and due to Government policy so far (as on 31.12.2019) India has able to installed only 37505.175MW Wind Power plant (Table 3). Due to favorable policy towards Renewable Energy (RE) taken by Indian Government in terms of soft loan and subsidy, numbers of private investors are attracted in RE based power plant installation. Fairly good impact has been observed.

Table 3: State Wise Wind Power installed as on 31.12.2019

| S. No. | STATE | Wind Power (MW) |
|--------|-------------------|------------------|
| 1 | Andhra Pradesh | 4092.450 |
| 2 | Gujarat | 7359.220 |
| 3 | Karnataka | 4753.400 |
| 9 | Kerala | 62.500 |
| 4 | Madhya Pradesh | 2519.890 |
| 5 | Maharashtra | 5000.330 |
| 6 | Rajasthan | 4299.720 |
| 7 | Tamil Nadu | 9285.265 |
| 9 | Telangana | 128.100 |
| 10 | Others | 4.300 |
| | Total (MW) | 37505.175 |

There are about 31 different models of wind turbines are being manufactured by more than 15 different companies in India, through (i) joint ventures under licensed production (ii) subsidiaries of foreign companies, and (iii) Indian companies with their own technology. The unit size of machines has gone up to 3.00 MW. Annual production capacity of wind turbines in the country is about 8,000 to 10,000 MW.

in a rotating system experiences a force (the *Coriolis force*) acting perpendicular to the direction of motion and to the axis of rotation. On the earth, the effect tends to deflect moving objects to the right in the northern hemisphere and to the left in the southern and is important in the formation of cyclonic weather systems.

1.6 Turbulence Wind: It refers to fluctuations in wind speed typically less than about 10 min. Turbulence is one of the most unpredictable weather phenomena. It is an irregular motion of the air resulting from eddies and vertical currents. It may be as insignificant as a few annoying bumps or severe enough to momentarily throw an airplane out of control or to cause structural damage. Turbulence is associated with fronts, wind shear, thunderstorms, etc.

The degree turbulence is determined by the nature of the initiating agency and by the degree of stability of the air. Depending upon the degree of stability of the air, it can be classified as light, moderate and severe or extreme turbulence wind.

Light turbulence momentarily causes slight changes in altitude and/or attitude or a slight bumpiness. Occupants of the airplane may feel a slight strain against their seat belts.

Moderate turbulence is similar to light turbulence but somewhat more intense. There is, however, no loss of control of the airplane. Occupants will feel a definite strain against their seat belts and unsecured objects will be dislodged.

Severe turbulence causes large and abrupt changes in altitude and/or attitude and, usually, large variations in indicated airspeed. The airplane may momentarily be out of control. Occupants of the airplane will be forced violently against their seat belts.

In extreme turbulence, the airplane is tossed violently about and is impossible to control. It may cause structural damage.

1.7 Extreme Wind Speed: Extreme wind speeds caused by severe weather conditions such as tornadoes, hurricanes/typhoons, and winter gales, etc. The extreme wind speeds or gusts can generate excessive loads on wind turbine components, leading to damage or failure of turbine components. Though the control system of modern wind turbines is designed to turn the rotor-blade assembly out-of-wind (feathered position) but at times due to malfunction or loss of grid connection may damage the turbine components.

1.8 Wind-speed Prediction and Forecasting

Due to variable nature of the wind resource, the ability to forecast wind speed is some time necessary. Broadly it could be classified into two categories.

1) Predicting short-term turbulent variations over a time-scale of seconds to minutes ahead, this may be useful for assisting with the operational control of wind turbines or wind farms.

2) Longer-term forecasts over periods of a few hours or days, which may be useful for planning the deployment of other power stations on the network. Short-term forecasts necessarily rely on statistical techniques for extrapolating the recent past, whereas the longer-term forecasts can make use of meteorological methods. A combination of meteorological and statistical forecasts can give very useful predictions of wind farm power output.

1.9 Techniques for wind resource assessment:

There are three basic steps to identify and characterize the wind resource in a given region. In general, they are prospecting, validation and optimization. In prospecting, the identification of potential windy sites within a fairly large region, in the range of several square kilometers areas

would be considered. Generally this is carried out by meteorologists who depend on various sources of information such as topographical maps (in India, Survey of India map), climatologically data from meteorological stations (e.g. India Meteorological Department), and satellite imageries, etc. A site visit also will be conducted at this stage and a representative location for wind measurement would be identified.

Validation process involves a more detailed level of investigation like wind measurements and data analysis. The most imperative and final step is micro survey and micro-sitting. The main objective of this step is to quantify the small scale variability of the wind resource over the region of interest. In micro survey, a small region in and around a wind monitoring station (generally 10 km radius) will be taken as a reference station for horizontal and vertical assessment. Finally, micro-sitting is carried out to position the wind turbines on a given area of land to maximize the overall energy output of the wind farm. In complex terrain, micro-sitting may involve two or more measurements, as a single site wind data cannot give good results. There are several industry standard Software in the market for resource modeling over a small region (micro survey) and later for micro-sitting. Wind Atlas Analysis Application Programme (WASP), Resoft Wind Farm, Wind PRO and GH Wind Farmer are some of the models available in the market. As the mathematical equations used in these models are linearised, there are some limitations in using these models in all atmospheric and topographic conditions. Even if these models have some limitations, they can give good results if 'handled' circumspectly.

1.10 The Daily Wind Cycle

During the day, the air above the land heats up more quickly than the air over water. The warm air over the land expands and rises, and the heavier, cooler air rushes in to take its place, creating wind. At night, the winds are reversed because the air cools more rapidly over land than over water. In the same way, the atmospheric winds that circle the earth are created

because the land near the Earth's equator is heated more by the sun than the land near the North and South Poles

Wind speed varies throughout the Country. It also varies from season to season. In Rajasthan, the wind blows more from April through October than it does in the winter. This is because of the extreme heating of the Desert during the summer months. The hot air over the desert rises, and the cooler, denser air above the Pacific Ocean rushes to take its place. In a state like Montana, on the other hand, the wind blows more during the winter.

1.11 Wind Speed Prediction: Wind energy is one of the most economical methods of electrical power generation. Wind power plants require continuous and appropriate wind speed for sufficient power generation. For the reliability and quality of the power system, it is required to develop highly accurate wind speed prediction methods. For the future's optimum grid operations short term wind speed prediction is critical and a challenging problem. The prediction problem can be considered as in three categories such as; Immediate Short Term, Short Term and Long Term based on the time horizon. In order to solve this problem, different methods have been implemented in the last decades, such as regression based methods, ANN models, Markov chains, support vector regression, spatio-temporal models, and recently, applications of hybrid ANNs models with statistical or other intelligent, approaches have received attentions.

1.12 Topographic Effect on Wind:

Topography Effect can be divided into 3 categories:

- Roughness
- Orography
- Obstacles

a. Roughness: Collective effect of the terrain surface & its roughness elements leading to an overall retardation of the wind near the ground it is referred as roughness of terrain. A rough to smooth change will lead to the speed up of the wind throughout the profile (Table 4). A high roughness class of 3 to 4 refers to landscapes with many trees and buildings, while a sea surface is in roughness class 0. Concrete runways in airports are in roughness class 0.5. The same applies to the flat, open landscape to the left which has been grazed by sheep.

b. Orography: It refers to the description of the height variations of the terrain with reference to a common datum such as the mean sea level.

Table 4: Roughness classes and the associated roughness lengths

| SN. | Roughness Class (RC) | Roughness Length (Z_0),m | Energy Index,% | Landscape |
|-----|----------------------|------------------------------|----------------|---|
| 1 | 0 | 0.0002 | 100 | Water surface |
| 2 | 0.5 | 0.0024 | 73 | Complete open Terrain with a smooth surface, such as concrete runways in airport, mowed grass. |
| 3 | 1.0 | 0.03 | 52 | Open agricultural area without fence and hedgerows and very Scattered buildings. Only softly rounded hill. |
| 4 | 1.5 | 0.055 | 45 | Agricultural Land with some house and 8 m tall sheltering hedgerows within a distance of about 1250 m. |
| 5 | 2.0 | 0.1 | 39 | Agricultural Land with some house and 8 m tall sheltering hedgerows within a distance of about 500 m. |
| 6 | 2.5 | 0.2 | 31 | Agricultural Land with many houses, shrubs and plants, or 8 m tall sheltering hedgerows within a distance of about 250 m. |
| 7 | 3.0 | 0.4 | 24 | Village, small towns, Agricultural Land with many or tall sheltering hedgerows, forest and very rough an uneven terrain |
| 8 | 3.5 | 0.8 | 18 | Larger cities with tall buildings |
| 9 | 4.0 | 1.6 | 13 | Very Large cities with tall buildings and sky scrapers. |

c. Obstacles: The proximity of buildings and large belts of trees also complicates the flow at a turbine (Fig.2). The obstacles block the flow of air and induce turbulence. Avoiding sitting turbine too close to large obstacles is best answer. If this is not possible careful monitoring of the turbulence and the choice of as large a tower as possible are the next best step.

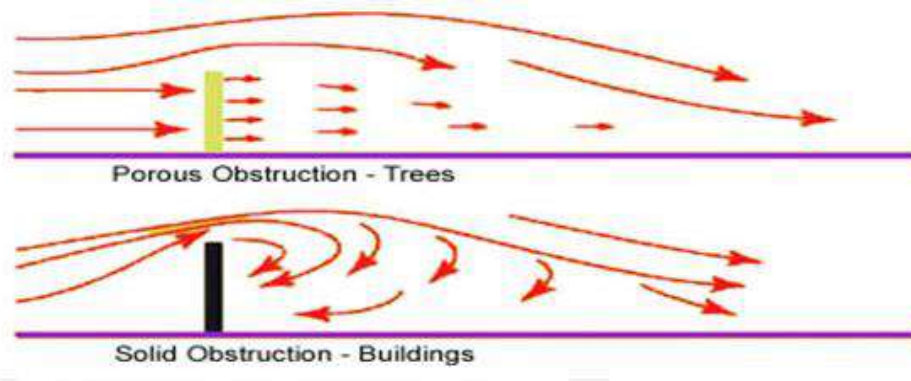


Fig. 2: Behavior of Wind with respect to medium

Wind speed reduction was observed, if Air flows from porous to nonporous medium (building) (Fig.2), due to upwind and downwind of obstruction (Fig.3), due to shelter (Fig.4). About 16-20% generation loss was noted in case of the obstacles.

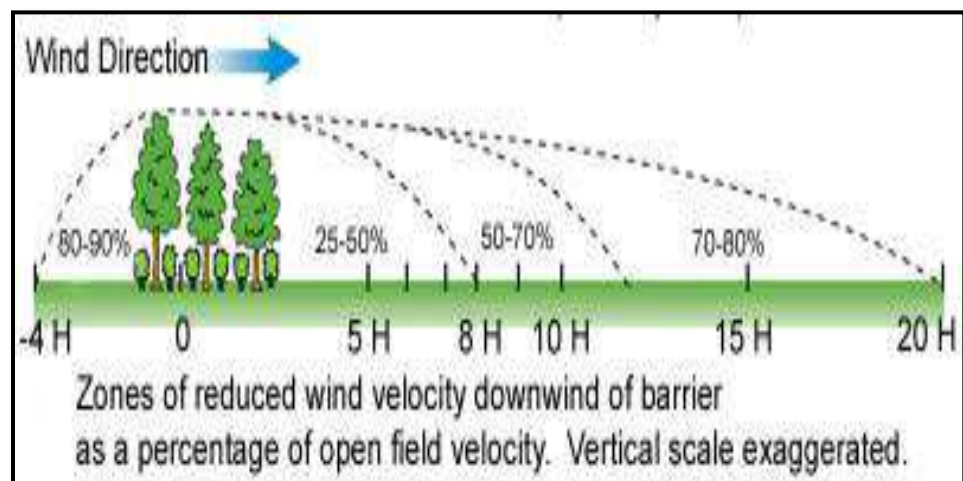


Fig.3: Reduction of air speed due to upwind and downwind of obstruction

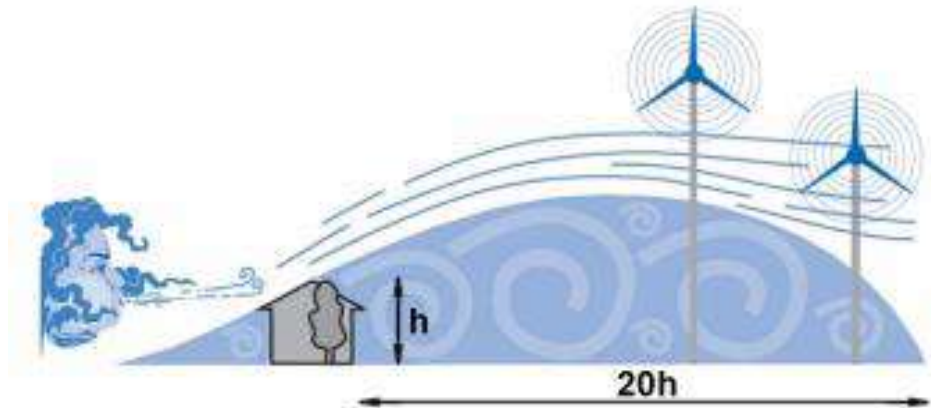


Fig.4: Reduction of air speed due to shelter

d. Height: Wind speed also varies with the height. Wind speed at ground level is zero and increases steadily with height up to the upper troposphere. The change of wind speed with height is known as wind shear or profile (Fig.5). Roughness length is really the distance above ground level where the wind speed theoretically should be zero. Because of low surface roughness water surface, wind speeds do not increase as much with height above sea level as they do on land.

A higher slant results in a greater pressure gradient between the warm and cold air and thus stronger wind. A second reason for the wind speed increasing with height, especially near the ground, is due to surface friction. The density of the air is highest at the surface and decreases with height.

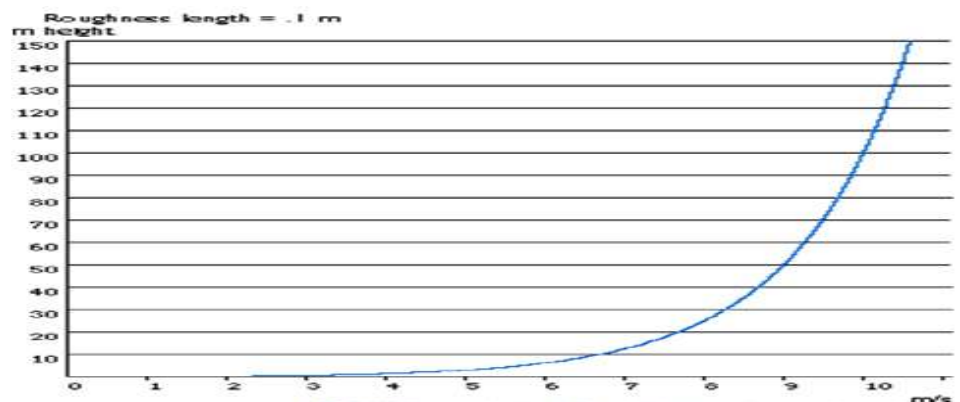


Fig. 5: Effect of height on Wind speed

1.13 Wind Resource Assessment:

There are three basic steps to identify and characterize the wind resource in a given region. In general, they are prospecting, validation and optimization. In prospecting, the identification of potential windy sites within a fairly large region, in the range of several square kilometers areas would be considered. Generally this is carried out by meteorologists who depend on various sources of information such as topographical maps (in India, Survey of India map), climatologically data from meteorological stations (e.g. India Meteorological Department), and satellite imageries, etc. A site visit also will be conducted at this stage and a representative location for wind measurement would be identified.

Validation process involves a more detailed level of investigation like wind measurements and data analysis. The most imperative and final step is micro survey and micro-sitting. The main objective of this step is to quantify the small scale variability of the wind resource over the region of interest. In micro survey, a small region in and around a wind monitoring station (generally 10 km radius) will be taken as a reference station for horizontal and vertical assessment. Finally, micro-sitting is carried out to position the wind turbines on a given area of land to maximize the overall energy output of the wind farm. In complex terrain, micro-sitting may involve two or more measurements, as a single site wind data cannot give good results. There are several industry standard Software in the market for resource modeling over a small region (micro survey) and later for micro-sitting. Wind Atlas Analysis Application Programme (WASP), Resoft Wind Farm, Wind PRO and GH Wind Farmer are some of the models available in the market. As the mathematical equations used in these models are linearised, there are some limitations in using these models in all atmospheric and topographic conditions. Even if these models have some limitations, they can give good results if 'handled' circumspectly.

1.14 How wind speeds vary with height?

Generally speaking the higher up in the atmosphere, from the surface to the upper troposphere, the greater the wind speed will be. This trend has a couple of explanations. First, the air higher up in the atmosphere gets thinner (that is, less dense). Because wind is less dense at higher altitudes, the same force driving wind will push the air more easily at those higher altitudes than it would at lower, denser airs. As such, the higher up you go the higher speed of the wind. Additionally, the closer to the ground you are the more impediments to wind speed. At ground level, the friction from trees, buildings, etc. (in addition to the friction of the earth itself) will slow the wind. But as you get higher up in altitudes, there will be less stopping the wind before they hit what they end up hitting (mountains, you, wind turbines, whatever that might be).

Lastly, “convection currents caused by the exchange of warm and cold air flow upward along the windward sides of mountain slopes, creating strong eddy currents near the peaks”. The record for directly measured surface wind speeds actually occurred on Mount Washington in New Hampshire at 231 miles per hour.

This trend between high altitudes and higher wind speeds is why effective wind turbines for renewable energy will be built as high as they reasonably can, with offshore wind turbines having the advantage over onshore wind energy that they can and are built to greater heights and are able to take advantage of the greater wind speeds at these greater altitudes.

1.15 Wind Energy Scenario in India & World

India stands 4th in the World in terms of installed wind power capacity of 51360.88MW as on 28th Feb 2017, contributes to around 56.76% of the grid-connected renewable energy power in the country. The wind energy market is continuing to grow steadily in India along with the rest of the

world. India is now one of the global manufacturing hubs for wind turbines with about 23 large wind turbine manufacturers, capacity ranging from 225 kW to 2500 kW and several small wind turbine manufacturers producing capacity ranging from 300 W to 50 kW. Due to downfall in per unit installed capacity of wind mill (Fig.6), by June 2020 cumulative installed capacity reached up to 37829.55MW (Fig.7), although potential of wind power in India 302251 MW.

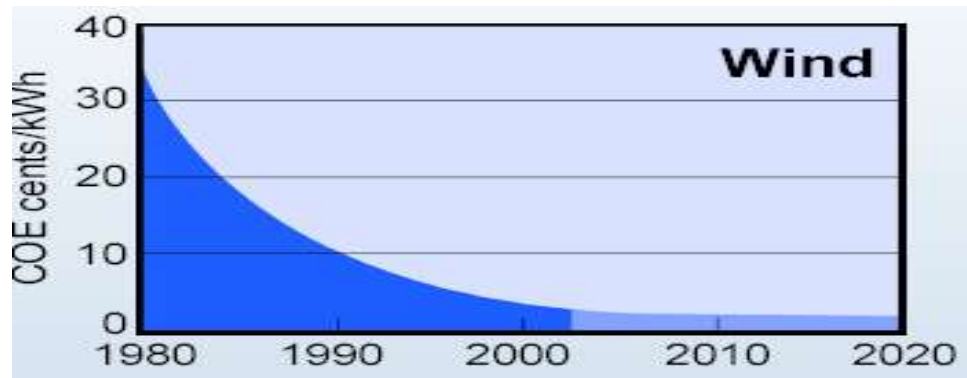


Fig.6: Variation in per unit installed capacity of wind energy with respect to time

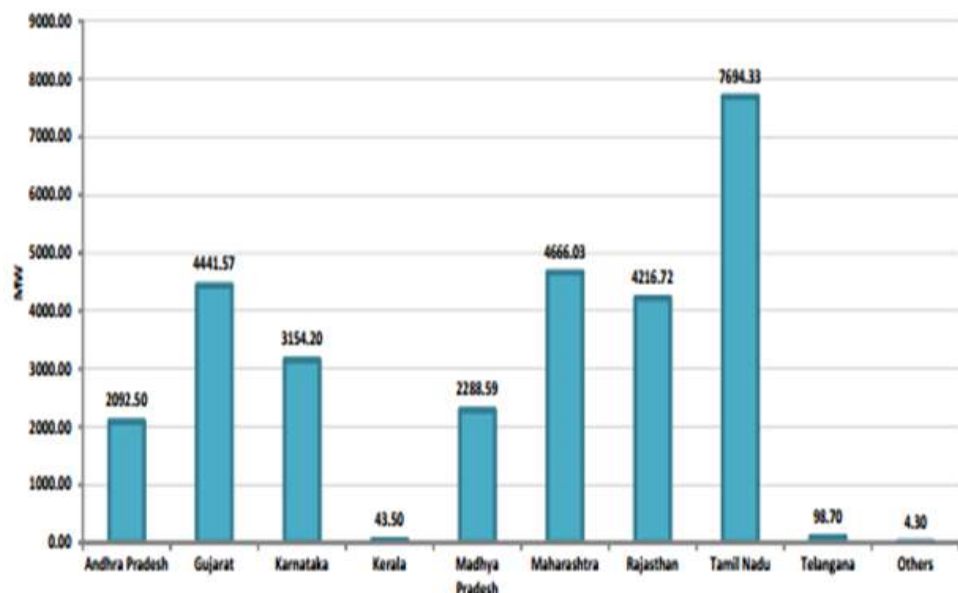


Fig. 7: India State wise wind energy installed capacity

Same way globally Wind power installed capacity reaches to 650.8 GW (Fig.8)

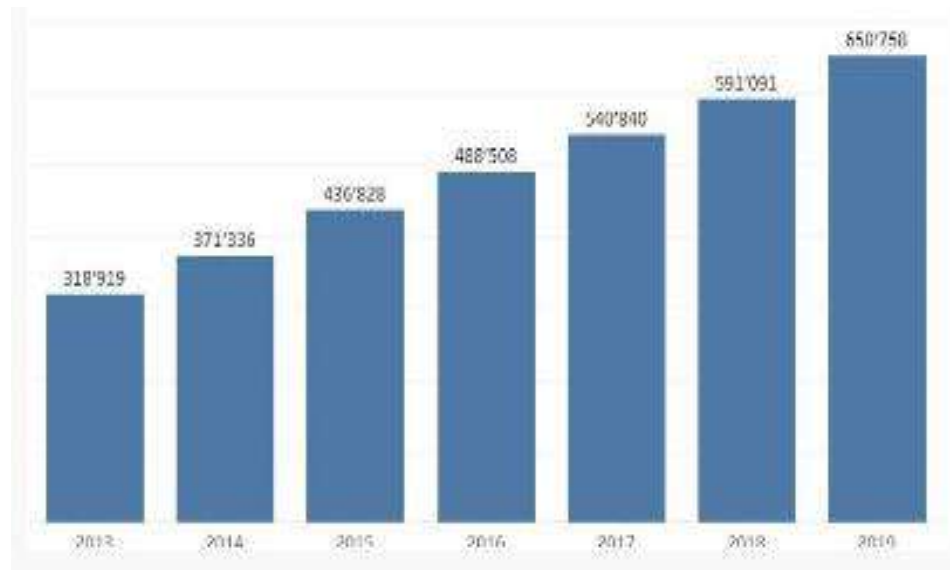


Fig. 8: Global wind energy installed capacity

Wind power installed capacity also varied from place to place (Fig.9). For example if Wind power is being installed at offshore, then foundation and installation cost would be more compared to onshore installation. However, in general turbine cost (which convert Kinetic energy of wind into mechanical energy) irrespective of place is playing major roll (Fig.10).

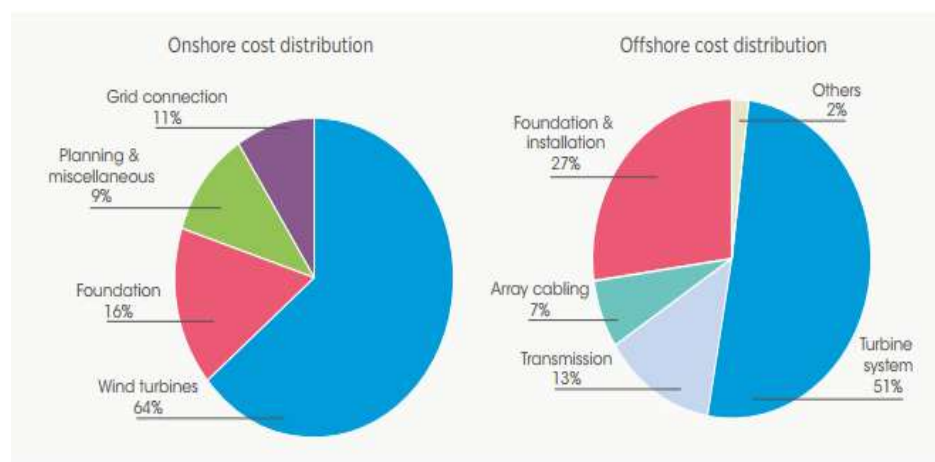


Fig.9: Break down of the installed capital cost for Onshore & Offshore Wind Mill

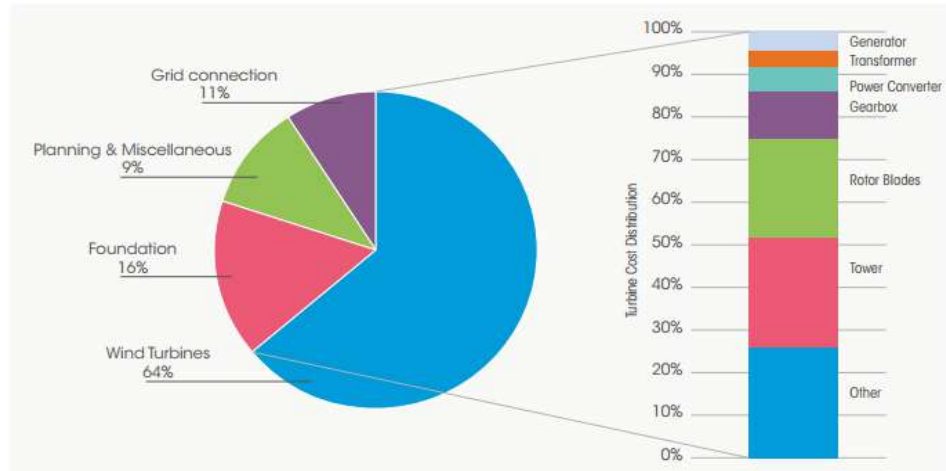


Fig. 10: Break down of the installed capital cost for Wind Mill

1.16 Basic principle of wind energy Conservation

The wind mill works on the principle of converting Kinetic energy of the wind to mechanical energy. We know that power is equal to energy per unit time. The energy available is the kinetic energy of the wind. The kinetic energy of any particle is equal to one half its mass times the square of its velocity. Wind energy power varied with rotor diameter of the wind mill and wind Speed (Fig.11). Small deviation in wind speed, drastically effects on wind power generations.

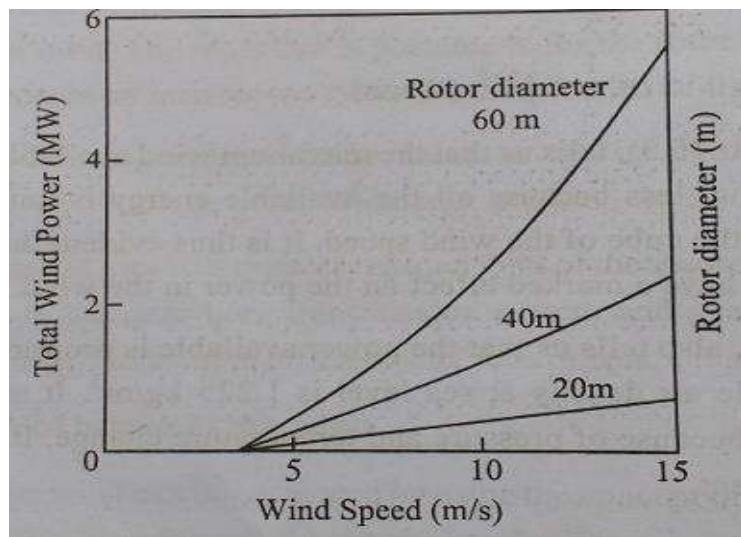


Fig.11: Power variations correspond to combined effect of rotor dia. and wind Speed

1.17 Characteristics of wind Power

Wind has two important characteristics—direction and speed. The direction of wind can be gauged using an instrument called the wind vane. It is also called a weather vane. One of the main characteristics of wind is its high temporal variations. Wind speeds can double or triple within seconds, meaning power increased 8 or 27 times (Fig.12). Turbulence intensity increases with obstacles such as buildings, trees or Steep Mountain tops.

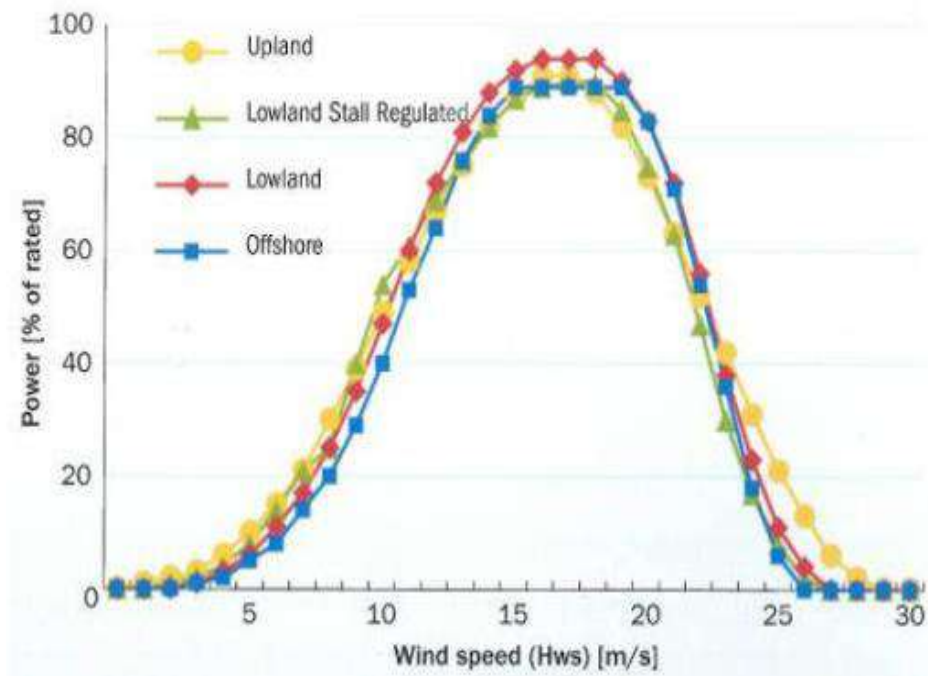


Fig. 12: Relation between wind Speed and Wind power generation

1.18 Site Selection for Wind Power

There are 5 key characteristics of a good wind power site:

- A high average wind speed. Typically the site would be on top of a hill or in a wide open space with no obstructions nearby.
- Sufficient separation from noise-sensitive neighbors. Modern wind turbines are remarkably quiet, but even so there are very stringent maximum noise levels that have to be met to obtain planning consent.

The minimum separation varies depending on the turbine size, but as a rough guide the following should ensure no problems:

- Good grid connection. All of the wind turbines that we supply require a suitable three-phase electrical supply to connect to. As a rough guide you will need an 11 kV transformer or substation that is roughly double the rated power output of the wind turbine you are considering, or an 11 kV three-phase power line passing close to the wind turbine site that can have a new transformer / substation connected to it.
- The larger multi-MW turbines could grid connect to 33 kV power lines, though generally it is too expensive for sub-1MW wind turbine projects to connect at such a high voltage.
- Good site access. Wind turbines are large and heavy, so the access roads and tracks to the site need to be capable of taking oversize loads with no weak bridges, excessively tight corners or steep gradients. Obviously as the proposed turbine gets larger, the size of the constituent parts that has to be delivered get larger and the access requirements more stringent. The smaller Endurance 55 kW turbine is delivered on standard articulated lorries, but all of the others come on special oversize trailers.
- No special environmental or landscape designations. A lot of the older objections to wind turbines due to bird strikes have now been shown to be unfounded, but even so it would be good practice to not install a wind turbine(s) in an area that had special bird designations. Peat bog is also generally a no-go area for wind turbines. Wind turbines are very visible within the landscape, so sites with landscape designations such as National Parks or Areas of Outstanding Natural Beauty (AONB) will have more difficulty obtaining planning consent, though it is still possible to get planning consent in AONBs.

1.19 Advantages and Disadvantages of Wind Energy

Advantages

One of the greatest advantages of Wind Energy is that it is ample. Secondly, wind energy is renewable. Some other advantages of Wind Energy are that it is widely distributed, cheap, and also reducing toxic gas emissions. Wind Energy is also advantageous over traditional methods of creating energy, in the sense that it is getting cheaper and cheaper to produce wind energy. Wind Energy may soon be the cheapest way to produce energy on a large scale.

The cost of producing wind energy has come down by at least eighty percent since the eighties. Along with economy, Wind Energy is also said to diminish the greenhouse effect.

Also, wind energy generates no pollution. Wind Energy is also a more permanent type of energy. The wind will exist till the time the sun exists, which is roughly another four billion years. Theoretically, if all the wind power available to humankind is harnessed, there can be ten times of energy we use, readily available.

One other advantage of wind energy that it is readily available around the globe, and therefore there would be no need of dependence for energy for any country. Wind energy may be the answer to the globe's question of energy in the face of the rising petroleum and gas prices.

Disadvantages

However, there are some disadvantages for wind energy, which may put a dampener in its popularity. Though the cost of creating wind energy is going down, even today a large number of turbines have to be built to generate a proper amount of wind energy. Though wind power is non-

polluting, the turbines may create a lot of noise, which indirectly contributes to noise pollution.

Wind can never be predicted. Even the most advanced machinery may come out a cropper while predicting weather and wind conditions. Since wind energy will require knowledge of the weather and wind conditions on long term basis, it may be a bit impractical. Therefore, in areas where a large amount of wind energy is needed, one cannot depend completely on wind.

Many potential wind farms, places where wind energy can be produced on a large scale, are far away from places for which wind energy is best suited. Therefore, the economical nature of wind energy may take a beating in terms of costs of new substations and transmission lines.

Wind Energy is non-dispatchable. This may also put a spanner in depending upon wind power as a primary energy supplier. Wind energy depends upon the wind in an area and therefore is a variable source of energy. The amount of wind supplied to a place and the amount of energy produced from it will depend on various factors like wind speeds and the turbine characteristics. Some critics also wonder whether wind energy can be used in areas of high demand.

- The main disadvantage regarding wind power is down to the winds unreliability factor. In many areas, the winds strength is too low to support a wind turbine or wind farm, and this is where the use of solar power or geothermal power could be great alternatives.
- Wind turbines generally produce allot less electricity than the average fossil fuelled power station, requiring multiple wind turbines to be built in order to make an impact.
- Wind turbine construction can be very expensive and costly to surrounding wildlife during the build process.

1.20 Suggested readings

- Ümmühan Baúaran Filik and Tansu Filik (2017) “Wind Speed Prediction Using Artificial Neural Networks Based on Multiple Local Measurements in Eskisehir”, Energy Procedia 107 (2017) pp:264 – 269.
- Tony Burton, David Sharpe, Nick Jenkins and Ervin Bossanyi (2001) “Wind Energy Handbook, Published by JOHN WILEY & SONS, LTD Baffins Lane, Chichester, West Sussex, PO19 1UD, England.

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Retail Marketing**

**Unit- I
Introduction to Retail Marketing**

2020

UNIT- I

Introduction to Retail Marketing

Content

- 1.1 Learning outcomes:**
- 1.2 Introduction**
- 1.3 Understanding retail marketing**
- 1.4 Importance of retail marketing**
- 1.5 Retailer**
- 1.6 Different important aspects of retailing**
- 1.7 Online retail versus offline retail**
- 1.8 Glossary**
- 1.9 FAQs**
- 1.10 Self Assessment Test**

1.1 Learning Outcomes

After going through this Module the student will be able to: -

- Understand the impact of retail space and retail marketing in reaching out to customers.
- Explore the opportunities for marketers.
- Recognize the use of digital media for the creation of products and services.
- Differentiate factors that influence the consumer.
- Distinguish the different elements that make the consumer for retailers

1.2 Introduction

In this session we are going to start off with introducing what retail is and why retail management is essential.

You would have gone to retail stores very often and you would have seen that the retail stores offer a lot of services. They offer the availability of products and a lot of other things that you can consume and have ownership at that very instance. Now consider for example, if I am a FMCG manufacturer who is involved in the manufacturing of let's say for example, soaps. And if I am in the business of manufacturing soaps, I require having a presence in the market to ensure that I can reach to as many consumers as possible and make sure that my soap is available to these consumers when they're trying to buy these products. But unless I have a third party or a third person or an organization that helps me in achieving this objective of reaching to the masses, it might be physically impossible or it might be infeasible for me to actually have the presence in the market as I would desire. Say for example, if you're considering a nation like India and if I as a soap manufacturer, let's assume that I have my plants in Delhi and Mumbai. If I have to make sure that the soap is available to all different States and to all different consumers in all of these

states, it might be infeasible for me to do it on my own. So that is why I try to establish different channels. And at the end of this channel where the consumer comes and purchases these products and services is what is essentially what we call as retailing.

1.3 Understanding retail marketing

So we will discuss retailing in detail during the entire duration of this course. But to define retailing, retailing is a set of activities that add value to the products and services sold to consumers for their personal or family use. Retailing encompasses the business activities involved in selling goods and services for the consumption of an individual personally, for their family or for the household use. So we are not essentially going to talk a lot about B2B related activities because there is a different channel by which B2B products and services are sold to consumers. But in the case of retailing, we'll specifically talk about products and services that are sold for the personal use, for family use or for household activities. It includes every different kind of products that you would see. Most frequently we'll be discussing about groceries, FMCG, etc, but even restaurants, movies, automotives, banking and a lot of these activities are part of retailing.

Now, where is retailing coming into the picture or where is retailing in the entire aspects of marketing that we discussed in the previous class. We had discussed that marketing is a set of activities, institutions and processes which are involved in the creation, communication, delivery and exchange of offerings which have value for customers, clients, stakeholders, and the society at large. Now remember we had discussed what each of these elements mean, what creation of value is, what communication of value is, what delivery of value is, and what exchange of value is.

Retailing is the activity that is predominantly involved in the delivery of value for customers. This is where a valuable product or a valuable service

that a manufacturer has made, say for example, in the case of soaps that I just mentioned to you, the soap that I have created has certain value that it provides to customers because it has certain benefits with respect to how it can be used for hygienic purposes, how it can give you a healthy lifestyle, etc. So there are some benefits that are there in the soap. There's a cost attached to the soap. So how this value is created is part of the creation of value concept. How this value is communicated through advertising, sales promotion, other channels is what communication of value is. How is this value or in other terms, the soap actually given to the customer and made available to the customer is what we discuss in the delivery part of value and exchange was exchange of a lot of other things. So, delivery of value is where we talk about the retailing aspects of things and in another format, you would have seen that we discussed about the four P's of marketing, which include the product, the price, the place and the promotion. The product is the actual tangible, intangible elements of the offering that is given to you. The price is how much you have to sacrifice in order to receive the product or receive that value in the product. The place is where we talk about the exchange happening or that is a marketplace from where the customer can procure or have ownership or have that product or services consumed, is where we talk about retailing. And of course promotion is all the other communication techniques that we'll discuss in other courses. Not particularly in this course. We'll talk about organizations that are involved in the activity called retailing.

1.4 Importance of retail marketing

Now, why is it that the retailers are so important and why is that retailing is such a critical part. Think about the example that I just gave you. In case we are considering that I am a manufacturer of soap. In order for me to

reach to the entire length and breadth of this country and to make sure that the product is available to every different customer who's looking for the product. It might be a rural customer who wants to get the product from a Kirana store nearby to his house or it could be an urban customer who wants to go to one of the organized retail channels and buy the soap. There needs to be a channel mechanism that is put in place. By a channel, I mean a set of intermediaries who work together so that goods can be taken from the manufacturer all the way to the consumer. So, like you can see in the picture here, you might find that the products are manufactured at the manufacturer level and once products are manufactured at the manufacturer level, it is not possible for the manufacturer, most of the times FMCG companies, etc to directly take it to all the different consumers who might be in crores. So hence there need to be a set of intermediaries who come into the picture. You might have wholesalers, you might have distributors, you might have cash and carry operators, you might have a lot of these different intermediaries, all of whom I'm calling as channel. I'll discuss about different channels in one of the subsequent sessions. But there is going to be a channel and towards the end of this channel, the last mile of this distribution is taken care of by the retailer.

1.5 Retailer

The retailer is the store or the organized mall that you go to and buy this product and it is from the retailer that the consumer gets this product or purchases this product. So retailing is an essential activity because retailing is what ensures that manufacturers have the reach in the market. Manufacturers are able to share the roles and responsibilities with other members in the channel. Say for example, manufacturer can focus on production and focus on creating more valuable goods and services for the consumers while all the other activities including distribution and including warehousing and including ensuring that the product is available

in really nice stores, in the shelves of really nice stores is all taken care of by other people who have expertise in such activities and not necessarily something that the manufacturer has to think about. So reach in the market, sharing roles and responsibilities and also sometimes by having an extremely good channel mechanism and having a really good retail partner ensures that manufacturers can now let go of a little bit of risk involved in ensuring that the products are available to consumers. Otherwise they would have to invest heavily in ensuring that they have the kind of retail presence, they have the kind of staff that is required to run all these retail

stores, they have to have the entire logistics system in place, etc. So retailing in itself is a very critical activity when it comes to marketing. And that is why this course will introduce to you all different aspects of retailing.

1.6 Different important aspects of retailing

In this session, we'll talk about why retailing is important, what are the different aspects of retailing which are worth consideration etc. In the subsequent sessions, we are going to discuss about the retail situation in India, retail consumer behavior in specific, we will go into different aspects that are important when it comes to creating a retail strategy per se, and we'll see what kind of case studies are available, which can give you some insights on how to manage a retail store. So at the end of it, you will not just get the idea of how a retail store is managed, but you'll get the idea of what happens in the backend with respect to planning, with respect to merchandising, with respect to visual merchandising, with respect to managing people in the store, etc. So a lot of these things will be covered in the duration of this course.

Having discussed what retailing is, now we'll try to identify why studying retailing is so critical when you're a marketing student. And why retailing has such great importance in the times that we live today. One of the major reasons why retailing is to be studied and studied well is because of the changing demographics. In a country like India, you would have seen that today consumers have a lot of purchasing power. Consumers are looking to consume more and more of products, which they were not doing in the earlier years. Consumers have higher income levels today. Consumers are much more employable. Consumers are getting influenced by a lot of international products. And a lot of globalization is coming in. Because of all of these changing demographics, consumers are demanding more from the manufacturer and consumers are expecting that they need to get all of these products at the end of their fingertips. So that is one reason why we need to have a very critical understanding as to what retailing is and how you can effectively function in the world of retail.

The second most important thing is that many a times we would find that retailing is a business which is considered to be easy to enter into. Many times you would find that many of the business operations start off at the retailing level rather than starting off at the manufacturing level because it seems like it is something that is easy to enter, but unless you are capable of understanding how the retail operations are to be taken care of, this ease of entry might actually become a disadvantage for you rather than an advantage.

The entire retail space in India is extremely fragmented. Yet you might find that many of these retailers who are available in India are in very small scale operations. You have organized retail that is coming in with large chain stores that are trying to dominate the entire market, but almost 85% plus of the entire retail stores in India are still the small independently owned retail stores. And the entire decision making involved in the retail

store is extremely complex. The complex decision making in itself makes it an important area where scientific decision-making methods have to be brought in. Say for example, you are in a fairly big retail store. Say for example, one of the Reliance Fresh or one of the big bazaars, etc. There might be somewhere between 10,000 to 20,000 different SKUs that are available in the store at any given point of time. Now, SKU is a stock keeping unit. This is the smallest unit at which you can identify a product or service. If you're taking, for example, one brand of biscuit and one size of packaging that will be in itself classified as an SKU. So if you have 10,000 to 20,000 different units of SKUs that are available, think about the complexity in ensuring that all of these products are available in the store, all of these products are arranged properly in the shelves and all of these products are replenished

whenever consumers are consuming it and the products get out of stock. So, these complex decisions make it very important that retailing has to be studied in great detail.

The next thing is many times when it comes to groceries or FMCG retail, the per-unit margin that the retailer gets is often not very substantial. So because of this low per unit margin in case you have to have profitable business, you have to have scientific methods that are employed to make sure that you can have large volumes of products which are highly in demand are sold. And because of such high volumes that you are able to convert, you might have substantially good revenues that are coming to you. So hence because of the low per unit margin, it becomes extremely critical that we understand what we are doing.

The customer's preferences are changing. You understand how internet retail and how organized retail is coming to dominate the entire market. Even in internet retail and organized retail, you'll find that there is more

and more fragmentation that is happening rather than just having one big department store that is catering to a large number of different product categories. You have niches that are coming in, you have very specialized retailers that are now operating wherein your target audiences is reducing in numbers. But the value that you offer to the customer is increasing. So there is always going to be a tradeoff between how many customers you're serving and how much value you are serving for each of these customers. So hence, again, for that requirement, it's important that you study retailing in detail.

The next element is of course of technology. With the emergence of internet, with the emergence of computational technology, how mobile phones are being used in the retail space, how artificial intelligence, virtual reality and a lot of such technology is being used in the retail space. The entire retail landscape is changing. You would have heard about terms like omni- channels, etc, which are now the buzzwords in most of the retail operations around the world because of the fact that technology is an enabler that helps you do all of these things.

The next element is because many parts of the country still have very limited access when it comes to retailers. Say for example, when you go outside the metros, tier one, tier two cities, and when you go to the rural parts of the country, which is a large segment of our population, retailers still are not present in huge numbers and it is not always possible for manufacturers to get to retailers and provide the kind of products and services that they expect to sell to these people. So again, inadequate access is another reason why retailing and studying retailing is exceptionally important. And more products in the market and high competition from a lot of different retailers, is again a reason. So because of all of these reasons and because of the entire context changing very rapidly, it is important that we understand retail and understand the

theories and techniques behind retailing so that we can manage our retail stores and we can design our retail experience much more efficiently.

Now, we had discussed what retailing is, we discussed why studying retailing is important. We will briefly cover a lot of these things which I'll come to in detail in subsequent courses.

Now since we are in India, we also need to have an understanding of how retail operations exist and how retail operations are present in India. If you look into all types of retailing in India, you will find that retailing in India can be classified into different types of formats. One of the most frequently found formats would be the Kirana store format or in the South India you would generally call them as Mulligan Curry format. So these are the types of stores which are small stores which don't carry a lot of different product variety and assortment but are available at a convenient location when it comes to the customer and such stores are often associated with a very strong relationship when it comes to consumers and the storekeeper and many times the storekeeper or one or two people who are working for the store keeper are the people who are managing the entire operations of the store.

Again, the store has its own advantages but then there is an organized retail format that is also picking up very rapidly in India. If you look into the percentage of consumers who go to organized retail as compared to Kirana stores, you might find that 80 to 85% of the market is still dominated by small mom and pop shops, which are also known as Kirana stores. Again, this is when it comes to the general merchandise and the fast moving consumer goods category. When it comes to other products, you'll find that there is a huge boom when it comes to luxury retail in India. You would find that a lot of global luxury brands are coming into India now. To take a few examples, even you might have experienced recently that the world famous apparel brands like H&M, Zara, Forever 21 etc, have had their presence in India for some time now. And a lot of customers,

especially customers in the urban sector are moving towards this kind of a very specialized luxury kind of a format and finding a lot of value there. Although the traditional apparel sector and the traditional clothing markets which are also present in most cities are also growing because of the number of consumers who are trying to consume more with the amount of savings and the amount of incomes that they're having. So in all of these sectors you will find that the retail landscape in India is completely changing and the retail landscape is changing in such a way that the retail is projected to grow at an exponentially high level.

1.7 Online retail versus offline retail

When it comes to online retail versus offline retail, you'll also find that there's a huge change that is happening. Online retail, until a few years ago, was not so great or not so big in India because there were a lot of problems that consumers had. There was a lot of resistance to accepting the online channel. People had a lot of credibility issues with the kind of products that were sold in India or sold on the online channel in India. People had a lot of problem with using a non-cash based payment methods on the online platform. People had a lot of problem with not having the right kind of haptic response that they expected from the product. Say, for example, when you're buying textile from an online store, you are not able to touch and feel the cloth and understand the quality of the cloth, which is one important element when you are going to a textile shop or an apparel store and buying clothes. So hence, such kinds of limitations used to exist in the online space. But today you might have seen that the penetration of online retail is subsequently or substantially increasing when it comes to the Indian consumers.

There have been a lot of mechanisms, a lot of methods that have been put in place by a lot of online retailers to eliminate the challenges that they

had earlier. Say for example, people who were not able to use credit card or debit card facilities earlier have now the option of using cash on delivery or paying cash on delivery format. People who are not able to analyze whether the product that is being sold on an online channel is going to be an original product or a counterfeit product, today they have the opportunity to have credible reviews that are available on online platforms where they can read the review and understand whether the product is an original product or a counterfeit product according to the previous consumer experiences. For people who had problems with having long delivery times that are required for a lot of products to be delivered to your household, today you are finding that more and more companies are providing you same day delivery, one day delivery, two day delivery, etc., making sure that the product is

available to you without a large amount of time being wasted in shipments, etc. And with respect to haptic response, now a lot of companies or a lot of e-commerce platforms are trying to bring in a lot of videos. A lot of reviews are brought in. Say for example, when you go to Amazon or when you go to Flipkart, you have the ability of reading through the experience of a lot of other consumers and thereby understanding what the product is like and how the product would perform, thereby reducing a little bit of the uncertainty that you would have when you're thinking about the product's haptic responses. So because of all of these things, gradually the Indian consumer is moving away from, I wouldn't say completely away from the online format, but consumers are moving gradually towards the online format because online format gives the consumer a lot of advantages as compared to the traditional retail store. You have the ability to shop anytime of the day. You don't have to be available in the store at the time that the store is operating. So you can shop 24x7. You have the ability of saving something in the cart and then making a decision later on. So you can keep pondering on the decision and

then identify whether or not to buy the product later on. You have information available on the website very easily, which can be compared with other products, so rather than just going to the store and not being able to identify which of the products you want, today you are able to compare products on the online platform and see which product is better as compared to the other product. And also you have the ability or you are given the opportunity to have a reduced price because of the fact that online channels are not necessarily warehousing a lot of products or are not necessarily paying a lot of rent when it comes to retail space. So because of all of these things, the Indian retail landscape is in a very dynamic place right now.

You are seeing that new and new formats are coming in. You're seeing that the online versus offline struggle or the tussle is now very dynamic and a lot of online companies are trying to grab a share of the offline market. A lot of offline companies are defending with strategies wherein they're trying to match the price of products in the offline and the online space. A lot of companies are now getting into the omni-channel space wherein they're trying to nullify the effect of online channels. You'd also find that a lot of Kirana stores which initially had been threatened by the organized retail are still dominantly present in the neighborhoods where they had been because of the loyalty and because of the kind of patronage that they get from a lot of consumers who live in the neighborhood.

Of course the kind of products that Kirana stores used to sell 10 years ago versus the kind of products that they sell today have undergone some amount of transformation, but still they are in business and many of them are doing quite well and many of them are now growing to get out of that traditional Kirana store business and getting into a small department store kind of business. So, all of these are things that are happening in the Indian retail space.

When you go out next time into the retail environment, try to connect with what I'm talking about and try to experience how the retail landscape in India is evolving. So, new trends are emerging in the retail scene in India, like I mentioned to you about the rise of internet as a very dominant channel by which many companies and many retailers are now reaching out to the consumers. Traditionally you would have seen that when the internet retail channels started off, they started off with a lot of products like movies and books, etc, which were easily identifiable by consumers and then can be shipped to consumers without having a lot of problem in the logistic operations of it. But as companies have moved on, they have now gotten to a lot of different product categories that are fulfilled by the online channel or by the internet channel. Today, you'll find that almost all different product categories are available in the internet

channel or the online channel. It includes everything right from the FMCG categories to everything about durables to mobile phones, to washing machines to internets. And today you can even order or book your car from the internet channel as well. Also you would find that traditionally, there was only a series of packaged goods that were available in the online channel. But today you will also find that a lot of companies that are now trying to create a niche with respect to green produce and how green produces are transferred to the online channel. Companies like Grofers, companies like Big Basket, etc, who are dominating the space, are able to provide customers with a lot of opportunities when it comes to buying fruits and vegetables and dairy products, etc, from the online channel. So, online retail is one of the biggest advancements that have happened in the retail space in India in the current decade. And this would be one of the most important aspects in the future as well.

Another thing that is happening is with the emergence of internet and with the availability of applications on the app stores and on the iOS platform, you have a lot of banks and a lot of service providers today who

are getting into the internet retail application. So no longer do you have the requirement of going to the bank to do your basic banking activities, but a lot of retail banking activities have now moved away from the physical branch into an online platform. Generally, it is on a website or it is on a mobile application, which again is a reason why a lot of banks are able to service many more customers as compared to a few years earlier. There is always a conflict or a tussle between the online and the offline channels. Say for example, you might find that a mobile phone, which is available in the online channel for 10,000 rupees is available in the traditional channel at say 12,000 or 12,500 rupees. Now this creates a conflict between these two channels. The conflict here is that many times consumers would want to buy the product only from the internet channel and not from the physical channel, but because the product is available in the physical channel, I might find the product nearby to my house. I'll go to the store and I'll use the product and I'll try to see the features. I'll try to touch and feel the product. I'll see whether the weight of the product is as I expected, etc, and hence I might consume a lot of time of the store and the store manager or the salesperson in the store, but I'll not buy the product from the store. I'll rather go to the internet platform or the online platform and buy it from there because I get a discount or I get a cheaper rate for this product in the online channel. Now this specific phenomenon is known as show-rooming and similarly there is a phenomenon called web-rooming which is when you go online and try to look at the product and the online channel but not buy it there and buy it in the physical channel.

Now, both of these are problems that many of the retailers and many of the manufacturers were facing because now you have one channel or one format which is gaining at the expense of the other four formats. If for example, your traditional retailers channel is giving all the information and

giving all the pre-purchase information to the customer while the customer never buys it from that store but always goes to the online channel to buy it from there because of the price advantage. When such situations happen there is going to be a lot of conflict, a lot of inefficiency and a lot of damage that it can do to both of these channels, which is not something that many of the manufacturers and many of the retailers want. So that is why there is this growing phenomenon of Omni-channel retailing that is getting predominance.

In Omni channel retailing, you're trying to seamlessly integrate both of these channels so that now consumers can go to either of these channels or can use both of these channels simultaneously, but the manufacturer and the retailer are not losing much by having such things. We'll come into details of Omni channel retailing in one of the subsequent sessions.

There is a lot of technology that is again, coming in apart from the internet alone. The internet of things is making the retail environment exceptionally great. You have a lot of artificial intelligence that is coming in today. You have a virtual reality that is coming in today. Say for example, if you want to buy a spectacle online, you might find that there are ways by which you can upload a picture of yours and see how that product is going to look on your face.

You can try on different clothes without actually going into the trial room in a retail space because now you have virtual reality wherein you can change clothes on a screen or in front of you in the store. So, all of these technologies are coming in and making the store experience much better for the customer. You also have a lot of these technologies that are coming in the backend of the store operations. Say for example, today, most of the products you find will have RFID tags. Now by having RFID tags, one, it is better for inventory management and for merchandise management. Two, it is very easy for retail stores to ensure that shoplifting and such kinds of problems are eliminated. So such kind of technology is also

coming into the retail scene, making it much more interesting. So these are a few of the introductory aspects that I wanted to bring to you in this session. In the subsequent sessions, we are going to discuss each of these things and much more in quite a lot of details so that you can get a complete and holistic idea of what retail has to offer and what you should do when you are in a retail role.

1.8 GLOSSARY

1. Retailer: The store or the organized mall that you go to and buy a product from.
2. SKU (Stock Keeping Unit): The smallest unit at which you can identify a product or service.
3. Artificial intelligence: The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.
4. Virtual reality: An artificial environment that is created with software and presented to the user in such a way that the user suspends belief and accepts it as a real environment. On a computer, virtual reality is primarily experienced through two of the five senses: sight and sound.
5. Haptic response: The use of touch to communicate with users.
6. FMCG: Fast Moving Consumer goods refer to items that are purchased and consumed frequently by consumers. These are non durable items, which have relatively low prices.
7. RFID tags: A type of tracking system that uses smart barcodes in order to identify items. RFID is short for "radio frequency identification," and as such, RFID tags utilize radio frequency technology. These radio waves transmit data from the tag to a reader, which then transmits the information to an RFID computer program. RFID tags are frequently used for merchandise, but they can also be used to track vehicles, pets, and even patients with Alzheimer's disease. An RFID tag may also be called an RFID chip.

1.9 FAQs

1. What is retailing?

Ans. Retailing is a set of activities that add value to the products and services sold to consumers for their personal or family use. Retailing encompasses the business activities involved in selling goods and services for the consumption of an individual personally, for their family or for the household use.

2. What is marketing?

Ans. Marketing is a set of activities, institutions and processes which are involved in the creation, communication, delivery and exchange of offerings which have value for customers, clients, stakeholders, and the society at large.

3. What are the four P's of marketing?

Ans. The four P's of marketing, include the product, the price, the place and the promotion. The product is the actual tangible, intangible elements of the offering that is given to you. The price is how much you have to sacrifice in order to receive the product or receive that value in the product. The place is where we talk about the exchange happening or that is a marketplace from where the customer can procure or have ownership or have that product or services consumed. And promotion is all the other communication techniques through which the consumer gets to know about the product.

4. Why are consumers moving gradually towards the online format of retailing?

Ans. Consumers are moving gradually towards the online format because online format gives the consumer a lot of advantages as compared to the traditional retail store. You have the ability to shop anytime of the day. You don't have to be available in the store at the time that the store is operating. So you can shop 24x7. You have the ability of saving something in the cart and then making a decision later on. So you can keep pondering on the decision and then identify whether or not to buy the product later on. You have information available on the website very easily, which can be compared with other products, so rather than just

going to the store and not being able to identify which of the products you want, today you are able to compare products on the online platform and see which product is better as compared to the other product. And also you have the ability or you are given the opportunity to have a reduced price because of the fact that online channels are not necessarily warehousing a lot of products or are not necessarily paying a lot of rent when it comes to retail space.

5. How is online retail one of the biggest advancements that have happened in the retail space in India in the current decade?

Ans. Traditionally, you would have seen that when the internet retail channels started off, they started off with a lot of products like movies and books, etc, which were easily identifiable by consumers and then can be shipped to consumers without having a lot of problem in the logistic operations of it. But as companies have moved on, they have now gotten to a lot of different product categories that are fulfilled by the online channel or by the internet channel. Today, you'll find that almost all different product categories are available in the internet channel or the online channel. It includes everything right from the FMCG categories to everything about durables to mobile phones, to washing machines to internets. And today you can even order or book your car from the internet channel as well. Also you would find that traditionally, there was only a series of packaged goods that were available in the online channel. But today you will also find that a lot of companies that are now trying to create a niche with respect to green produce and how green produces are transferred to the online channel. Companies like Grofers, companies like Big Basket, etc, who are dominating the space, are able to provide customers with a lot of opportunities when it comes to buying fruits and vegetables and dairy products, etc, from the online channel. So, online retail is one of the biggest advancements that have happened in the retail space in India in the current decade.

6. What is web-rooming?

Ans. Web-rooming refers to a shopping process that starts with online browsing and then leads to buying in-store. This type of shopping allows customers to touch, feel and test products before purchasing.

Web-rooming works best with products such as appliances (58% of purchases in this category), electronics (54%) and apparel (49%). Generally, there are no shipping costs associated with these purchases and consumers receive their product immediately.

7. What is show-rooming?

Ans. Show-rooming refers to a shopping process that begins with in-store browsing and then leads to an online purchase. This type of shopping allows for customers to find cheaper prices and better deals with exclusive-to-online promotions.

Show-rooming works best with products such as entertainment (55% of purchases in this category), electronics (52%) and toys/games (50%).

Consumers who opt for show-rooming enjoy the convenience of receiving their purchases at home, and generally are able to choose from a wider selection with greater availability when shopping online.

8. What is Omni-channel retailing?

Ans. Omni-channel marketing creates a seamless customer experience across all channels. This marketing strategy takes digital interactions, such as social media and e-commerce purchases, and integrates them with interpersonal interactions. These in-person interactions include in-store staff for B2C brands as well as sales and customer success managers for B2B brands. Omni-channel marketing requires all departments to work together.

9. What is the importance of RFID tags?

Ans. By having RFID tags, one, it is better for inventory management and for merchandise management. Two, it is very easy for retail stores to ensure that shoplifting and such kinds of problems are eliminated.

1.11 Self Assessment Test

- 1) When the marketer focuses on making whatever products are easy to produce and then trying to sell them, that marketer has a;
- a) Production orientation
 - b) Product orientation
 - c) Marketing orientation
 - d) Selling orientation

Ans: A

- 2) When customer expectations regarding product quality, service quality and value based price are met or exceeded then it leads to-
- a) Customer satisfaction
 - b) Planning excellence
 - c) Customer value
 - d) Customer dissatisfaction

Ans: A

- 3) The aim of marketing concept is-
- a) To earn profit
 - b) To increase sales
 - c) Customer satisfaction
 - d) NONE OF THE ABOVE

Ans: C

- 4) Pricing technique which considers pricing for customers living in different locations around world is classified as-
- a) Cyclical pricing
 - b) Demographical pricing
 - c) Geographical pricing
 - d) Cost pricing

Ans: C

- 5) Broad pricing strategies for new products are-
- a) Market skimming prices
 - b) Market penetration pricing
 - c) Product line pricing
 - d) Both a and b

Ans: D

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UNIT- I

Introduction to Marketing

Content

- 1.1 Learning outcomes:**
- 1.2 Introduction to marketing and customer value**
- 1.3 Value Creation, communication, delivery and exchange**
- 1.4 Segmentation**
- 1.5 Target Marketing**
- 1.6 Positioning**
- 1.7 Marketing Mix**
- 1.8 Glossary**
- 1.9 FAQs**
- 1.10 Self Assessment Test**

1.1 Learning Outcomes

After going through this Module the student will be able to: -

- Identify impact of digital space and digital marketing in reaching out to customers.
- Find out the opportunities for marketers on digital platform.
- Use digital media for the creation of products and services.
- Differentiate factors that influence the consumer
- How and What are the different elements that make the consumer so unique?

1.2 Introduction to marketing and customer value

During the course of this module, we'll be discussing different techniques, elements, some amount of theory in some examples from the real world about how digital space and digital marketing has made a huge difference in how we reach out to customers today. But before I start off with this whole course, I would like to start off with a small definition of what marketing is, because it is important for us to understand what marketing is before we delve into details of how it is done in the digital space. So I like to start off all my courses with this one central question. What is marketing? And it's very interesting. I get a large number of different answers for this one question. Some of my students think marketing is about advertising.

Like most of you, you would feel that it is about creating a lot of attentive, lot of interesting advertisements so that you can entice customers to see and be interested in your products. Some other students feel that advertising is all about having a really motivated sales force. It is about making sure that there are people who are going to now sell your product and try to convince other customers to buy your product. There are other students who feel that advertising and sales is of course there, but marketing is more importantly about understanding the needs of customers and then providing solutions to these needs, which can satisfy these customers. Now marketing is all of these, but marketing is a little bit beyond what all of these things are. So marketing has a formal definition like any other discipline.

Marketing is the activities, set of institutions and processes that are involved in the creation, communication, delivery and exchange of offerings which have value for customers, clients, partners, and the society at large.

Now, I understand that it might be a little confusing definition at first. I'll try to break this definition down. Central to this entire definition of what marketing is, is the concept of value. Now, this again is a question that is a follow through to the question which I started off with, as to what marketing is? Value, what do you understand value is? Value is central to all marketing decisions and all marketplace decisions.

Now, the definition of, or the conceptual understanding of what value is. Value is basically the net sum of all benefits and costs that a customer has to incur in order to have that offering.

Now, what do I mean by benefits and costs? There are different benefits that the customer gets by the consumption of a product. Say for example, you might be having a mobile phone with you right now. The mobile phone gives you a set of benefits. The first and most important benefit that you get from a mobile phone is the fact that you can communicate with your friends, your family members, and other people in your workspace and your colleges, and in other places that you go to. So communication is one benefit that you get. Mobile phones today have other benefits as well. Say for example, you have benefits such as watching, being able to watch a movie when you're sitting on the

train, being able to play a game when you are not finding sleep, being able to find any sorts of entertainment at any point of time. This is again a benefit that the product gives you. There are other services that come alongside a mobile phone. Say for example, if your mobile phone fails to work one day, you have a service station where you can go to and give the mobile phone. It can be repaired very easily. So there are services that are provided to you as benefits and on top of all of that, there is a certain image that you get as somebody who's able to access and use a certain mobile phone. Say for

example, if you are one of those people who is carrying a new generation, extremely flashy, extremely costly and premium mobile phone, your friends will look up to you and say that you are somebody who can afford such a phone. So it gives you a certain esteem benefit. So there are different benefits that you can avail from the consumption of a product. There are of course product benefits, there are service benefits, and there are image benefits. So if you add up all of these benefits, you get the net sum of all the benefits that you get from the product.

Now in order to have all of these benefits, you also need to incur certain costs. What are the costs that you have to incur? Of course the first and most obvious cost that you have to incur is the cost that you have to pay in order to buy that device or buy the mobile phone as the example we were talking about. So this is basically the monetary cost that is involved. Now apart from the monetary costs, there are other costs that you need to incur as well. Say for example, you don't have a shop or a place nearby your house where you get the mobile phone, so you have to travel, say a hundred kilometers to get access to such a device. Then there is travel cost that is involved. You don't know which mobile phone is the most appropriate for you. You might have to search for all the mobile phones that are out there. You might have to find out the different features and the different specifications of each of these devices before you go about and buy this phone. So there is a cost that you have to incur with respect to the time that you spend in searching for information on that phone. There are also other costs that are involved. Say for example, you are letting go of certain other benefits that you could have had by spending money on this phone. So all of these costs can also be added up, like we added up all the benefits and if you take the difference between all the benefits that you get and all the costs you had to incur in order to get these benefits, you get what is essentially called as value.

So benefits minus cost is what value is, and value is very central to all consumption decisions that we make and that is necessarily why we have this very famous quote, a very famous term that we use "value for money". This is where we think about what is the offering, what is the product out

there in the market that gives us the maximum value for the amount of money that we're giving. So value like I defined to you is central to what marketing is.

Now we take this value and we do four things with this value. The first of these things is creation of this value. Now you would have understood by definition that to create value you basically have to define the benefits that the customer gets. And you also have to define the costs that the customer has to incur.

1.3 Value Creation, communication, delivery and exchange

In order to create value, you have to create a product. Say for example, we are talking still of the example of the mobile phone. You might have to create a mobile phone that customers can buy. Now, creation of this mobile phone will incur all kinds of technology that goes into the mobile phone, the camera that goes into the mobile phone, the battery specifications that go into the mobile phone, the android

versus IOS versus other operating systems that are going to be used by the phone, the kind of services, the kind of warranty, all of these elements that are part of the offering that you're making. You have to create all of these things. You will also have to put a price tag to this mobile phone or you will have to put a price tag to the offering that you're giving to the market. Thereby you are creating this value.

Many companies use internal resources to create this value. There might be research and development teams. There might be engineers who work in mobile phone companies who are creating value for customers. There might be expertise that is outsourced at times. So in many ways, marketers are involved in creating this value. Now, when you're creating value, one important aspect that you have to always remember is that this value should be important for customers, who you are expecting to buy this product, and if this value has to be worthy enough for customers to buy it, then you basically have to ensure that the value that you create is in line with what

the customers expect. So that is where marketers are involved in understanding what are the needs and demands of customers. We will come to all of these concepts in the due course of this course.

So that is about creation of value. Now, once you have created value, it is not just important for you to have created value and then just keep this value within the organization. You have to take this value out there to the customer and communicate this value to the customer. There are different vehicles that we use to communicate all of this value to customers. One important element that we use and something that you all would be very familiar with, is advertising. There are a lot of advertisements out there. Same example, mobile phones, you might have seen that there are a lot of advertisements about mobile phones, some mobile phones advertise the fact that they have a great practical life. Some other mobile phones advertise the fact that they have extremely great camera quality. Some other mobile phones talk about the fact that they are durable and sturdy. So any of these value concepts or any of these elements of value that you have defined, you can take to the customer and communicate to the customer. So creation is the first element of what you do with this value. Communication is the next one.

The third element is delivery. Once you have created value in the format of a product or a service or an offering, you have to then communicate all of this value so that customers are aware of it. Once the customer becomes aware of the value that you're offering, the customer might be interested to come and acquire all of this value from you. The customer might be expecting to buy this mobile phone from certain places. You have to ensure that there is a certain mechanism in place that will enable the customer to buy it from you. So you might have seen there are phones which are available on the online space. There are other phones which are available in electronic stores, nearby your house. There are also a lot of big department stores which carry mobile devices. So the marketer has to ensure that the delivery of all of this value is also planned properly. The place where the

customer can come and buy this value from you is also to be defined properly. So that is where delivery of value happens.

And the last element is exchange of value. There are a lot of things that you give to the customer. We defined creation of value, communication of value and delivery of value, but there are a lot of valuable things that the customer has for you as well. One of the most important things that you derive from the customer is money. As exchange for the products and services that you offer to the customer, you have to get back money that is worthwhile for the benefits that you provide. So there is exchange, involved there. There are a lot of informational resources that the customer has. For example, do customers really like your product? Do customers actually feel that your mobile phone is worthy enough to suggest everything that it

claims to have is really met? So you need to have a lot of feedback generated from customers.

You need to understand how the customer feels about your product as compared to a competitor's product. So a lot of market research is also involved where you get back a lot of value from customers. So creation, communication, delivery and exchange of value is what we are going to define first and this essentially is what marketing is all about. So when we talk about advertising, it comes into communication of value. When we talk about sales, it comes into delivery of value. When we talk about understanding the needs of the customers and fulfilling them, it comes into creation of value. So every different aspect that you see is somewhere or the other related to this definition of what marketing is and then we not really do this for customers like you and me. There is marketing that happens in organizations that are involved in a business to business domain.

So that is where we call about marketing for clients. There are a lot of places where you have partners who are involved in business activities. So that is where marketing gets involved into helping or providing value for partners. There are also a lot of organizations which do a lot of societal activities, a lot of NGOs out there, a lot of companies that are really involved in making the

world a better place, who also use a lot of marketing techniques. So that is why the definition of marketing essentially talks about the set of activities, institutions and processes that are involved in the creation, communication, delivery and exchange of offerings which have value for customers, clients, partners, and the society at large. So this essentially is what marketing is. We will delve into details of each of these concepts and we'll see how each of these concepts is relevant in the digital space in the next module to come.

Okay, so now that we have understood the definition of marketing, we also have understood the concept of value, we will move further with other concepts that are relevant. The first and most important of these things is to understand how you're going to operationalize your marketing strategy for customers, and the most important thing here is to understand what the customer is looking for. So we defined three broad things in order to explain what customers look for. The first of these elements is the concept of need. Then we'll discuss what wants are and thirdly, we'll discuss what is the demand, because all of these three terms are very closely linked with one another, but they have different meanings when it comes to the understanding and operationalization of what marketing is.

So, a need is what the customer has as a basic requirement. Say for example, the customer can have both physiological and psychological needs. Hunger for example, is a very basic need. Without food you cannot survive, so when you feel hungry, we call that to be a very basic need, thirst or any other needs that are basically required for your survival are what we understand as needs. Now many a times the customer knows that needs can be fulfilled by different things. Say for example, you can fulfill the need for hunger by eating Dosa, by eating a hamburger, by eating pizza, or by eating something even more expensive. Now, each of these things that the customer knows can satisfy that basic need of hunger is what a want is. So, when the customer can identify an offering that can satisfy basic need, it becomes a want. Not all wants can be satisfied or fulfilled by customers. There might be customers who want a burger, but can only afford a Dosa.

There might be customers who want to eat at a five star restaurant but can only eat at a normal roadside vendor. So when the want is also accompanied by an ability to pay for that offering, we call it to be a demand. So, needs are your basic necessities. Wants are the offerings that are available which you can direct or you can understand as being able to fulfill these needs, and demands are when these wants are also accompanied by an ability that the customer has, to pay for them.

1.4 Segmentation

Now, once we have understood needs, wants and demands, we need to understand one other thing that is very relevant to how marketing operates and that is you have very limited resources. Any company, for example, has limited amount of money to advertise, has limited people in the sales force and has limited partners to reach out to the market. So it becomes very essential for marketers to identify the right set of customers for whom they should create value, communicate value, exchange and deliver value. So to do this, we use the concept of segmentation, targeting and positioning.

What is segmentation? You would have heard this term very frequently. What is segmentation? Now if you take, for example, any market out there, the market consists of a large number of people. We generally called markets to be heterogeneous in nature. When you have a large number of people, say for example, people who are using mobile phones, there are a large number of people out there. There are consumers who are interested in buying mobile phones, which are cheaper. There are consumers who are interested in buying mobile phones which can be used for playing very sophisticated games, there are consumers who might be interested in having mobile phones that have great cameras, there are other customers who are interested in buying mobile phones that have longer battery life.

So if you take for example, any product or any service or any offering, the consumers or the market in general is very large. It is heterogeneous. To satisfy the needs of all customers out there, it becomes very difficult for organizations. Think about the case of building a mobile phone that is the best for all customers. It might be a very difficult activity. One, you might not be able to achieve excellence in all different things that you do and even if you are able to achieve excellence in all different things, your product might be extremely expensive, because of which the customer cannot buy it. So it becomes extremely important for you to divide this heterogeneous market down into smaller, homogeneous groups for whom you can create products, for whom you can have campaigns that can target them, for whom you can basically reach out to the customer by having a retail channel or having a delivery channel. So the act of dividing the entire market down into smaller, homogeneous groups is what is essentially called as segmentation.

Segmentation can be done by different means. One of the most commonly used methods of doing segmentation is at a geographic level. A geographic segmentation is where you basically break down the market into different regions on a geographical map. Say for example, if we're talking about India, food habits in the northern part of India and the southern part of India are diverse. People like certain foods in the northern part of India, people like certain other foods in the southern part of India. So you can have different offerings for different parts of the country depending on the kind of food habits that they have. Such kind of segmentation is called as geographic segmentation.

Another way of which segmentation happens is based on demographics. Demographics can include anything from age, income, gender, lifecycle stage, all of these different things. Say for example, if you take offerings out there, for example, mobile phones. There might be mobile phones that are offered to customers who are in a certain age group. For younger people, you will have mobile phones that are more worthy of playing games, which might be more entertaining, which might have greater battery life. For a little older people, you might have phones which are loaded with features which can be used in a professional space. For people who are elderly, people who have difficulty to see and use a touch-screen, you might have mobile phones with large buttons which can be easily used by these people.

So this is a segmentation that has happened based on age. Similarly, you might have offerings which are for really wealthy and really rich class of people. You might have other offerings for people in the middle class. There are people who don't earn as much. You will have offerings even for them. So segmentation can even happen with respect to the income group of people.

There are different people who are in different lifecycle stages, for example, somebody who has just married versus somebody who is thinking about getting married. There are different types of consumption that these two people might think. For people who have just recently had a child versus people who are still in college, there might be different ways in which these two set of people are consuming products. So based on age, gender, income, lifecycle stage, and other parameters that you can see on the screen, there might be a demographic segmentation that might happen. So geographic segmentation and demographic segmentation are very obvious, very easy to understand.

The third basis by which segmentation can happen is based on how people think, how people believe that the world should be, how people's attitudes are about different things and different objects. So this is known as psychographic segmentation. Say for example, if you are somebody who is an adventure-lover, say for example, if you're somebody who believes in the idea of using green things versus somebody who is only interested in saving a lot of money; these are basic elements of personality of these people. So segmentation of the market can also be done based on the ways in which people behave, the ways in which people have attitude, depending on the different things that they see in the world. So this is basically psychographic segmentation, which is the third way in which segmentation can happen.

And the last way in which segmentation can happen is based on behaviors that people show in the marketplace. Say for example, if you are a frequent flyer, you get greater benefits from the airline because your behavior is in such a way that you consume air tickets and consume air travel much more than other people. So you might get extra miles for your travel. You might get freebies for your travel. You might not have to wait in long queues. You might get privileged checking counters, etc. based on the behavior that you show and depict in the marketplace. There might be other consumers who

might be heavy users, say for example, if you consume internet as part of your mobile package, and if you are a heavy internet user, the service provider will give you a package that is suited for you because you are a heavy user. So based on your behavior, based on the kind of consumption that you do, you can be also segregated into different sets of people. So that is the last basis by which segmentation can happen.

So geographic, demographic, psychographic, and behavioral are the four ways in which you can do segmentation. But by doing segmentation in either of each of any of these ways, you basically are trying to break down a very complex and heterogeneous marketplace into smaller homogenous groups. And by breaking them down into smaller homogenous groups, you are now able to reach out to one or a few of these groups and make products and services and offerings that will be most appropriate for one or a few of these groups, rather than having a product that doesn't necessarily be good enough for any of these set of people. So that is why we do segmentation.

1.5 Target Marketing

The next activity that we do is to identify one or a few of these groups, where in you can go and try to offer your products and try to make revenue from these groups.

Targeting is where you identify which of these segments is going to be the key or the central segment where you're going to offer your products. So you have to basically look for five different things when you're trying to do targeting. The first of these things is that the segment should be measurable. The second is where it should be substantial. The third is where it should be accessible. The fourth is where it should be differentiable. And the last is where it should be actionable. Now I'll talk about each of these different things.

Now think about the case where the entire heterogeneous market was divided into smaller homogeneous groups, which we call segments. The segments should be measurable. When I say the segment should be measurable, you should be able to measure key factors that are relevant to you in each of these segments. Say for example, the number of customers who are there in each of these segments, the total number of competitors that are there in these segments, all of these different elements should be

measurable.

The second element is that the segment should be substantial. When you are thinking about entering a certain segment and trying to offer your products to one certain segment, you should be able to get revenues or get money from that segment, which is going to be enough for sustaining the costs of your business. It should also be able to provide you profits. It should also be able to give you growth potential in the future. So the segment should be substantial in itself.

The segment should be accessible. The segment should not be something that is very difficult to reach out to. It should not be very difficult for you to get into that segment. You should be able to access the segment and that is where we say that targeting should be done in a way that you are looking into segments which are accessible.

The fourth element and the most important of all of these elements according to me, is that the segment that you choose should be differentiable. There are going to be a set of competitors that you will have to compete against in the marketplace for the offerings which you are providing to the customer. Say for example, if you go back to the example of a mobile phone, there are going to be a set of competitors out there. Now, the segment that you choose should be in such a way that you are able to differentiate your product as opposed to your competitors.

And the last one is where your segment should be actionable. When I say actionable, there are these elements of a marketing mix that we generally use in order to create a marketing strategy. You should be able to create a difference from everybody else by using the marketing mix elements that you are employing. So the product, the price, the place, and the promotion should be giving you a different result as compared to another segment. So that is where we call about the fact that targeting should be in such a way that it is actionable.

Each of these elements together will define the target group that you are going to decide. So we started off with segmentation. We took the whole market, broke it down into different smaller groups. We looked into each of these groups as to what are the key factors that are relevant to us. What kind of potential growth do we have? Do we have enough scope to differentiate ourselves? Do we have an ability to access these segments and

are these segments actionable? All of these elements are looked into, to identify one or a few of these groups that we call as target groups. This is what essentially targeting is. Now, once you have done segmentation, you have gotten down to a set of groups which are most appropriate to you, the next element is called positioning.

1.6 Positioning

What is positioning? Positioning is where you're trying to create a position for yourself and the position that you create is not in the marketplace but in the customer's mind because it is important for us to understand that the customer is a person who thinks, who understands reality, who has a worldview of how his needs are, his requirements are, what are the different products out there? What are the key attributes of each of these products? How is product A different from product B? How is mobile phone A different from mobile B? And for the marketer, it is important that we create an image in the customer's mind. That is what we try to do by doing positioning. And to do positioning, we have a set of vehicles that we can use. Say for example, you can use advertising, sales promotion, retail presence etc. Your product itself can be used for positioning, but the key here is to understand that you are trying to differentiate yourself from the other players in the market. Now, differentiation can be done based on the product that you offer. It can be done based on the image that you offer. It can be done based on the people who work for you. It can be done based on where your product is available. It can also be done with respect to the price that you offer.

Now to do differentiation, you have to identify what are the specific points of differentiation which are going to make your product different from the other products that are out there. Say for example, if you're a mobile phone company that is pioneering mobile phones, which have exceptionally great battery life. We live in an age where most mobile phones have a life of say, at max one day or two days. Now, think about yourself as a company which has come out with a mobile phone that has a battery life of a week. This becomes a point of differentiation as compared to other people in the marketplace. Now, when you position yourself as somebody who's the leader with respect to battery life, you are able to create a different image. Every customer who now thinks about your product knows that you're known for exceptional battery life.

You can think about creating an image for durability of the product. You can think about creating an image for service that you're offering. You can think about any of these elements and identify a point of differentiation. Once you have identified a point of differentiation, you have to create the marketing mix elements, which is the product, the price, the place, and the promotion, which coincide with these points of differentiation that you have created.

Now, let me also tell you that we are not always trying to be very different from the competition. There are some elements which also have to be very closely associated with the competition. These are generally known as the points of parity, where in you're creating a lot of features in your products or offerings which are closely associated with other competitors in that certain category.

We know how a mobile phone looks. If you're going to drastically change the styling of the phone, say for example, today you have a phone which basically is a flat phone, which has a touch-screen display, which is not very thick, which is basically a rectangle shape. Now think about the case where I'm giving you a phone that is a very bulky cylinder. Now, customer doesn't associate it with the regular phones that he sees in the market. So your product has to be different from your competitor to differentiate it, but at the same time there are a lot of features and a lot of characteristics which customers associate with a certain category of products. So you have to also be close to these category products or these points of parity.

1.7 Marketing Mix

Now, once you have identified which segment we enter into, once you have done your targeting properly, once you have created a position in the customer's mind, then you can actually get to the market with the marketing mix elements, which are the four Ps which we'll discuss next.

Okay, so the four Ps of marketing like you would have all heard about or the marketing mix, is what we'll discuss next. So these four Ps are essentially what we try to, strategize and what we try to change in the marketplace. These include the product, the price, the place, and the promotion.

What is the product? The product is basically the offering that you give to the customer. It can be something that is a pure good. It can be something that is a pure service. It can be something that is a combination of the two.

Say for example, in the case of a mobile phone, the product is the mobile phone. It is also associated with a set of services that go alongside. Say for example, the after sales service that you get, the warranty that you get, etc. So that is what the product is all about.

Now the product is associated with a certain cost that you have to incur. That is what the price is. A mobile phone can be 20,000 rupees worth. The mobile phone can be worth 50,000 rupees. These two elements are extremely important because many times the customer starts comparing these two elements. The customer starts comparing the product, the features of the product with the price that the customer has to pay. So the product and the price are very critical in the success of any product.

The third of these elements is the place or the third P is what place is. Now, place is where the customer can actually come and purchase the product. Remember, we discussed about the electronic store near to your house or the department store where you can buy a mobile phone from? That is essentially what the place is. So which is the place in the market where you can go and buy this product. So that is where we talk about place.

And the last of these is promotion. Promotion is where you're trying to make sure that the customer is aware of your product, the customer is motivated and the customer has a good reason to come and buy your product. So it could be advertising, it could be sales promotion, etc.

So, all of these four elements, is what we have in our hands to play around with and make sure that we can generate as much revenue from the market as possible. Now, the reason why we dealt into detail of what marketing is, what value concept is, what segmentation, targeting, positioning is, and what the four Ps are, is because we want to introduce all of these concepts to be similar to what we see in the digital space. Say for example, marketing in the digital space and in the traditional space is more or less the same.

You're still creating, communicating, delivering, and exchanging value for customers in the digital space. If you think about an e-commerce company, it is delivering and exchanging value to customers. If you think about a company that is a pure play retailer, it is delivering value to the customers. If you think about a company that is interested in creating entertainment for you, like the YouTube channels that you see, they are creating value for you. If you talk about different types of social media and digital media

promotions that we do, you're communicating your products to the customer or communicating value to the customer. So the definition of marketing still holds in the digital space. If you think about segmentation, targeting and positioning, we still have to do a lot of segmentation in the digital space. Although in the traditional space, segmentation is a difficult activity to do because you don't have data for customers.

In the digital space, segmentation becomes very easy. Say for example, you would have seen a lot of search engine advertising. You would have seen that every time you go to the search engine and type for some specific set of information, you'll see a lot of product advertisements or a lot of links which are sponsored, that popup. When you go to social media, when you go to Facebook, you would have seen that a lot of advertisements about products which you are looking for at an e-commerce platform and then purchased, are popped up to you. These are all ways in which the value is communicated to you. Now the way by which the marketer reaches out to you is based on either your geography, either the demographics that you have; your age, gender, income, etc. or the kinds of browsing behavior that you display.

So even in the digital space there is a very strong presence of segmentation. There's a very strong presence of targeting that is a very critical method by which the products are positioned in your mind. Say for example, you might see certain advertisements where products are displayed in certain fashions. You might see that the product is doing certain social campaigns so that they create an image of being socially aware. All of these elements are done in a way to position the product and create an image of the product in your mind. You would have also seen that in the digital space you have the four Ps operationalized very effectively. The product; it could be a traditional product, it could be a product that is completely digital. It could be a product like a mobile phone, it could be something that is similar to a YouTube channel that gives you a lot of really rich content. So the product holds in the digital space. Price; you have traditional channels where you are paying a certain price, you have subscription based models or a premium model or other business models that are operational in the digital space.

The place that you get the product from in the traditional space was predominantly retail or direct selling where you went to the store and

bought products for you. You went to the hospital to get a service or you went to a bank to get certain financial services or you had direct selling where people came to your house and sold the product to you. With the emergence of the digital space today, you have a new business model that operates. Say for example, you have e-commerce sites where you can buy the product. The product comes to your house. It is shipped to your house. You have other services and other offerings that are also delivered to you from the digital space.

You have the last P, which is promotion, which has significantly changed, which will be a major impact or a major area that we'll discuss. Say for example, how has promotion changed? Traditional advertising is not as relevant as it was earlier. You have digital and social media that is picking up, so all the different elements of the definition of marketing, the concept of value, segmentation, targeting, positioning, and the marketing mix elements, all of them are still relevant in the digital space. And in the course of the remaining sessions in this program, we will be discussing about each of them in detail. So a basic understanding of what marketing is, what value is, what segmentation, targeting and positioning is, and what the marketing mix elements are, is what the first session is offering to you. So we'll come back in the next session and discuss in detail about consumer behavior and what relevant theories are important for us to understand in how consumers behave in the digital space.

1.8 GLOSSARY

1. **Marketing:** It is the activities, set of institutions and processes that are involved in the creation, communication, delivery and exchange of offerings which have value for customers, clients, partners, and the society at large.
2. **Value:** While buying a product or a service, if you take the difference between all the benefits that you get and all the costs you had to incur in order to get these benefits, you get what is essentially called as value.
3. **Advertising:** Advertising is a marketing communication that employs an openly sponsored, non-personal message to promote or sell a product, service or idea.
4. **Need:** A need is what the customer has as a basic requirement.
5. **Want:** When the customer can identify an offering that can satisfy basic need, it becomes a want.
6. **Demand:** When the want is also accompanied by an ability to pay for that offering, we call it to be a demand.
7. **Heterogeneous market:** A large market in which distinctive and different customer needs can be identified and which can then be used as a basis for segmentation.
8. **Homogeneous market:** When we divide a heterogeneous market down into smaller, homogeneous groups for whom we can create products and have campaigns that can target them, it becomes a homogeneous market.
9. **Segmentation:** The act of dividing the entire market down into smaller, homogeneous groups is what is essentially called as segmentation.
10. **Targeting:** It is the process in which we identify which segments are going to be the key or the central segment where we are going to offer our products.
11. **Points of parity:** Sometimes you have to create certain features in your products or offerings which are closely associated with other competitors in that certain category. Such features are called points of parity.
12. **Product:** It is basically the offering that you give to the customer. It can be something that is a pure good. It can be something that is a pure service. It can be something that is a combination of the two.

1.9 FAQs

1. What is marketing?

Ans. Marketing is the activities, set of institutions and processes that are involved in the creation, communication, delivery and exchange of offerings which have value for customers, clients, partners, and the society at large.

2. How is value created?

Ans. In order to create value, you have to create a product. Say for example, we are talking still of the example of the mobile phone. You might have to create a mobile phone that customers can buy. Now, creation of this mobile phone will incur all kinds of technology that goes into the mobile phone, the camera that goes into the mobile phone, the battery specifications that go into the mobile phone, the android versus IOS versus other operating systems that are going to be used by the phone, the kind of services, the kind of warranty, all of these elements that are part of the offering that you're making. You have to create all of these things. You will also have to put a price tag to this mobile phone or you will have to put a price tag to the offering that you're giving to the market. Thereby you are creating this value.

3. What is the difference between needs, wants and demands?

Ans. A need is what the customer has as a basic requirement. Say for example, the customer can have both physiological and psychological needs. Hunger for example, is a need, is a very basic need. Without food you cannot survive, so when you feel hungry, we call that to be a very basic need, thirst or any other needs that are basically required for your survival are what we understand as needs. Now many a times the customer knows that needs can be fulfilled by different things. Say for example, you can fulfill the need for hunger by eating dosa, by eating a hamburger, by eating pizza, or by eating something even more expensive. Now, each of these things that the customer knows can satisfy that basic need of hunger is what a want is. So, when the customer can identify an offering that can satisfy basic need, it becomes a want. Not all wants can be satisfied or fulfilled by customers. There might be customers who want a burger, but can only afford a Dosa. There might be customers who want to eat at a five star restaurant but can only eat at a normal roadside vendor. So when the want is also accompanied by an ability to pay for that offering, we call it to be a demand. So, needs are your basic necessities. Wants are the offerings that are available which you can direct or you can understand as being able to fulfill these needs, and demands are when these wants are also accompanied by an ability that the customer has, to pay for them.

4. What is segmentation?

Ans. The consumers or the market in general is very large. It is

heterogeneous. To satisfy the needs of all customers out there, it becomes very difficult for organizations. Think about the case of building a mobile phone that is the best for all customers. It might be a very difficult activity. One, you might not be able to achieve excellence in all different things that you do and even if you are able to achieve excellence in all different things, your product might be extremely expensive, because of which the customer cannot buy it. So it becomes extremely important for you to divide this heterogeneous market down into smaller, homogeneous groups for whom you can create products, for whom you can have campaigns that can target them, for whom you can basically reach out to the customer by having a retail channel or having a delivery channel. So the act of dividing the entire market down into smaller, homogeneous groups is what is essentially called as segmentation.

5. What is geographic segmentation?

Ans. A geographic segmentation is where you basically break down the market into different regions on a geographical map. Say for example, we're talking in India, food habits in the northern part of India and the southern part of India are diverse. People like certain foods in the northern part of India, people like certain other foods in the southern part of India. So you can have different offerings for different parts of the country depending on the kind of food habits that they have. Such kind of segmentation is called as geographic segmentation.

6. What is demographic segmentation?

Ans. Segmentation can also be done based on how people think, how people believe that the world should be, how people's attitudes are about different things and different objects. So this is known as psychographic segmentation. Say for example, if you are somebody who is an adventure-lover, say for example, if you're somebody who believes in the idea of using green things versus somebody who is only interested in saving a lot of money; these are basic elements of personality of these people. So segmentation of the market can also be done based on the ways in which people behave, the ways in which people have attitude, depending on the different things that they see in the world. So this is basically psychographic segmentation.

7. What is positioning?

Ans. Positioning is where you're trying to create a position for yourself and the position that you create is not in the marketplace but in the customer's mind because it is important for us to understand that the customer is a person who thinks, who understands reality, who has a worldview of how his needs are, his requirements are, what are the different products out there? What are the key attributes of each of these products? How is product A different from product B? How is mobile phone A different from mobile B? And for the marketer, it is important

that we create an image in the customer's mind. That is what we try to do by doing positioning.

8. What is marketing mix?

Ans. The marketing mix is the mixture of four marketing elements or the fourP's that we try to strategize and change in the marketplace. These include the product, the price, the place, and the promotion.

1.11 Self Assessment Test

Identify the best answer from the options given to the question, or complete the blank space.

- 1 Marketing is the activities, set of institutions and processes that are involved in the _____, communication, _____ and exchange of offerings which have value for customers, clients, partners, and the society at large**
- a. Creation, Delivery
 - b. Making, Pricing
 - c. Selling, Advertising
 - d. Using, Servicing

Ans: a

- 2 _____ is basically the net sum of all benefits and costs that a customer has to incur in order to have an offering.**
- a. Product
 - b. Value
 - c. Offering
 - d. Market

Ans: b

- 3 The process of dividing heterogeneous markets to smaller homogenous groups is called__.**
- a. Marketing Research
 - b. Targeting
 - c. Positioning
 - d. Segmentation

Ans: d

- 4 Which among the following was not discussed as an element of the marketing mix?**
- a. Price
 - b. Place
 - c. Positioning
 - d. Product

Ans: c

- 5 Marketers do segmentation based on demographic profiles of customers. Which among the following are not attributes used for demographic segmentation?**
- a. Place of residence
 - b. Income
 - c. Age
 - d. Gender

Ans: a