TYBA

SEMESTER - VI (CBCS)

GEOGRAPHY PAPER - IX

RESEARCH METHODOLOGY IN GEOGRAPHY

SUBJECT CODE : UAGR606

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RESEARCH METHODOLOGY IN GEOGRAPHY

Unit Structure :

1.0. After going through this chapter you will be able to understand the following features:

1.1 Objectives

1.2 Introduction

1.3 Subject Discussion

1.4 Research in Geography - Concept & Meaning of Research

1.4.1 Types of Research

1.4.2. Stages Significance of Research

1.5. Research Methodology

1.5.1. Meaning and Concept

1.5.2. Types

1.6. Research Problems

1.7. Research design

1.8 Summary

1.9 Check Your Progress/Exercise

1.10 Answers to the Self Learning Questions

1.11 Technical Words and Their Meaning

1.12 Task

1.13 References for Further Study

1.1 OBJECTIVES

By the end of this unit you will be able to:

- Understand the meaning, objective, structure, significance, motivation, utility of research
- Discuss ethical consideration in research
- Learn about plagiarism
- Understand types of research
- Discuss issues and problems in research

1.2 INTRODUCTION

In this unit we will learn what is meant by research at first. Objective, structure, significance, motivation, utility of research all will be discussed one by one. We will also evaluate the ethical consideration in research. Next in queue, stands plagiarism. After that, in the latter part of this unit types of research along with issues and problems in research will be discussed.

1.3 SUBJECT-DISCUSSION

Research occupies a fundamental part in most professions and refers to a search for knowledge. It is a scientific and systematic way of thinking and search for relevant information on a specific topic. According to the Advanced Learner's Dictionary of Current English the meaning of research is "a careful investigation or inquiry especially through search for new facts in any branch of knowledge." Research objectives describe what we expect to achieve by a project. Researchers find out cause and effect relationship between variables and these hypotheses formulated by researchers could be tested in another piece of research. Systematic method of finding solution to problem is an important objective of research. To discover the truth and fact, to know old conclusions with new data, to find new conclusion with old data, to reach more conclusions from available data, to explain unexplained horizon of knowledge, to put forward an entirely new theory, to study and resolve contradiction in the area of a study etc. are a few objectives of research. Furthermore significance of research lies in gathering necessary information particularly in field of one's work. It is very difficult for the researchers to explain the significance of their novel work to others. It may turn out equally tough as carrying out experimental studies. Hence researchers require giving much attention to explain the significance of their work. Research structure is basically an outline of the work and most research projects share the same general structure. We may say that the design of any research project must be made in such a way that considerable attention is given on the research methods and the proposed data analysis.

1.4 CONCEPT MEANING OF RESEARCH

Research in simple words means search for knowledge. It is said research is a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. Some people consider research as a movement, a movement from the known to the unknown. It is actually a voyage of discovery. Research is an academic activity. Research is often referred to as ***'scientific inquiry'*** into a specific problem or situation because the search for facts needs to be undertaken systematically and not arbitrarily.

William C. Emory in the book 'Business Research Methods' defines "research is any organized inquiry designed and carried out to provide information for solving a problem."

The Webster's Dictionary states "research is a careful critical inquiry or examination in seeking facts or principles; diligent investigation in order to ascertain something."

V. Clover and H. Balsley define "research is the process of systematically obtaining accurate answers to significant and pertinent questions by the use of scientific method for gathering and interpreting information."

James Black and Dean Champion state "scientific research consists of obtaining information through empirical observation that can be used for the systematic development of logically related propositions attempting to establish causal relations among variables."

Research is a systematic inquiry that investigates hypotheses, suggests new interpretations of data or texts, and poses new questions for future research to explore. Research is conducted to develop and evaluate concepts and theories. Basic research attempts to expand the limits of knowledge. It does not spontaneously bring out solutions to a particular, pragmatic problem, but it had been said that there is nothing as practical as a good theory.

1.4.1 TYPES OF RESEARCH

There are a variety of research methods. This may be classified into several categories according to the nature and purpose of the study and other attributes. The researcher is expected to specify and discuss the type of his research according to the following classifications.

1. Descriptive Research: It is the fact finding investigation.
2. Analytical Research: It is concerned with testing hypothesis.
3. Applied Research or Action Research: It aims at solving specific problems. It aims at establishing policy programs that will help to improve social life.
4. Fundamental Research: It is also known as basic or pure research.
5. Quantitative Research: This research is based on statistical analysis.
6. Qualitative Research: This research aims at exploration of the social world.
7. Conceptual Research: It is used by the philosophers and thinkers to develop new concept.
8. Empirical Research: This research is a data based research which only depends on experience and observation.
9. One time research: This research is carried on for a single time period.
10. Longitudinal research: This research is carried on over several time periods.
11. Diagnostic Research: It is called clinical research this research aims at identifying the cause of the problem and finding a solution to it.

12. Experimental Research: It is commonly used in sciences like physics, chemistry, biology and medicines.
13. Historical research: This research studies of the past records.
14. Exploratory Research: It aims at gaining information about an issue in hand.
15. Basic Research: This research is carried on for the purpose of gaining knowledge.
16. Cross section research: It involves the study of many cases at one point.
17. Theory testing research: It aims at testing the validity of a theory.
18. Theory building research: It establishes and formulates theories

1.4.2 STAGES AND SIGNIFICANCE OF RESEARCH

Scientific research is the application of the scientific method to investigate any relationships amongst natural phenomena or to solve a technical or medical problem. It is a process for experimentation that is used to explore observations and answer questions. Scientific research involves a systematic process that focuses on being objective and gathering a multitude of information for analysis so that the researcher can come to a conclusion. This process is used in all researches. Even though there are a series of steps, the new information or thinking might cause a scientist to back up and repeat steps at any point during the process. There are eight stages in scientific research process.

Step 1: Identify the Problem

The first step in the process is to identify a problem or develop a research question.

Step 2: Review the Literature

After identifying the problem, the researcher must learn more about the topic under investigation. To do this, the researcher must review the literature related to the research problem. For this purpose academic journals, conference and Government reports and library must be studied. This step provides foundational knowledge about the problem area. The review of literature also educates the researcher about what studies have been conducted in the past, how these studies were conducted, and the conclusions in the problem area.

Step 3: Clarify the Problem

Many times the initial problem identified in the first step of the process is too large or broad in scope. In step three of the process, the researcher clarifies the problem and narrows the scope of the study. This can only be done after the literature has been reviewed. The knowledge gained through the review of literature guides the researcher in clarifying and narrowing the research project. It keeps researchers on the right track.

Step 4: Clearly Define Terms and Concepts

Terms and concepts are words or phrases used in the purpose statement of the study or the description of the study. These items need to be specifically defined as they apply to the study. Terms or concepts often have different definitions depending on who is reading the study. To minimize confusion about what the terms and phrases mean, the researcher must specifically define them for the study.

Step 5: Define the Population

The purpose of the study is to assist the researcher in identifying the group involved in the study. In research terminology, a research population is generally a large collection of individuals or objects that is the main focus of a scientific query. It is for the benefit of the population that researches are done. Hence defining the population assists the researcher in several ways. Firstly, it narrows the scope of the study from a very large population to one that is manageable. Secondly, the population identifies the group that the researcher's efforts will be focused on within the study. Finally, by defining the population, the researcher identifies the group on whom the results may be applied after the conclusion of the study. However, due to the large sizes of populations, researchers often cannot test every individual in the population because it is too expensive and time-consuming. This is the reason why researchers rely on sampling techniques. These ensure that the researcher stays on the right path during the study.

Step 6: Develop the Instrumentation Plan

The plan for the study is referred to as the instrumentation plan. The instrumentation plan serves as the road map for the entire study, specifying who will participate in the study and how, when, and where data will be collected.

Step 7: Collect Data

Once the instrumentation plan is completed, the actual study begins with the collection of data. Data Collection is an important aspect of any type of research study. Inaccurate data collection can impact the results of a study and ultimately lead to invalid results. Thus the collection of data is a critical step in providing the information needed to answer the research question. Every study includes the collection of some type of data—whether it is from the literature or from subjects—to answer the research question. Data can be collected in the form of words on a survey, with a questionnaire, through observations, or from the literature.

Step 8: Analyze the Data

It is observed that effort and resources dedicated to steps 1 through 7 of the research process culminate in this final step. We know that the purpose of analyzing data is to obtain usable and useful information. The researcher finally has data to analyze so that the research question can be

answered. In the instrumentation plan, the researcher specified how the data will be analyzed. The researcher now analyzes the data according to the plan. The results of this analysis are then reviewed and summarized in a manner directly related to the research questions.

The term significance when related to research has a very specific role. Significance refers to the level of certainty in the results of a study. In the field of business the government has focused on the use of research in solving operational problems. Research provides the basis for all government policies. Decision making may not be a part of research, but research certainly helps the policy makers in making decisions. Research is necessary for allocation of nation's resources. Research has a special significance in solving various operational and planning problems of business and industry. Research is very important for social scientists for studying social relationship and also to find out answers of various social problems. Thus we can say research is the fountain of knowledge and also an important source of providing guide lines for solving different business, governmental and social problems.

1.5 RESEARCH METHODOLOGY

1.5.1. CONCEPT MEANING OF RESEARCH METHODOLOGY

Research methodology is a way to solve the research problem systematically. It is a study about how research is done scientifically. In research methodology we follow various steps that are adopted by a researcher in studying his research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods but also the methodology. In fact the scope of research methodology is much more than that of research methods.

1.5.2.TYPES (QUALITATIVE AND QUANTITATIVE RESEARCH)

Research undertaken to measure quantity or amount is called as quantitative research. The objective of quantitative research is to develop and employ mathematical models, theories and hypothesis. In social science, quantitative research is widely used in psychology, economics, demography, sociology, geography, community health, human development, gender studies, political science and many more. Specifically we can say quantitative research includes generalization of models, theories and hypothesis, development of instruments, experiments and collection and analysis of data. Statistics plays a very important role in quantitative research. For example research undertaken to find out the number of unemployed graduates or the number of unemployed in general. On the other hand, research, which is undertaken to find out the quality of a particular situation or phenomenon, is called as qualitative research. For instance, a research undertaken to find out the reasons as to why employees remain absent from work, or why people behave in certain manner. The motivational research is an important type of qualitative research. Qualitative research is especially important in the behavioral

sciences where the main aim is to find out the underlying motives of human behavior.

1.6 RESEARCH PROBLEMS

There are several problems in research. The lack of scientific training in the methodology of research is a major problem. Competent researches are lacking and many a times research has become merely a cut and paste activity. The systematic approach is lacking. There is very less coordination between education and industries. There should be university – industry interaction programs. Many a times the industrial and business units do not have proper confidence on the materials supplied by the researcher. Research studies are often overlapping which should be avoided. There should be a proper code of conduct for researchers. Library management new acts and rules of research should be available to the researchers.

1.7. RESEARCH DESIGN

After defining the research problem the preparation of the design is known as Research Design. It is a detailed outline of how an investigation will take place. It is very important. Decisions regarding what, where, when, how much, by what means constitute a research design. A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine the relevance to the research propose.

2.7.1 A research design looks in to the following points:

1. What is the study about?
2. Why is the study being done?
3. Where will the study be carried out?
4. What type of data is required?
5. Where can the required data are found?
6. What period of time will the study include?
7. What will be the sample design?
8. What technique of data collection will be used?
9. How will the data be analyzed?
10. In what style will the report be prepared?

2.7.2 Keeping in view the above stated design decision one may split the overall research design into the following parts.

1. The sample design
2. The Observational design
3. The Statistical design
4. The operational design

A research design should be such in which the information can be easily obtained and the objective of the problem should be studied properly. Some research design are flexible where as some are rigid. In some research design random sampling can be done and in some other purposive sampling is required. In some research design unstructured instruments are used for collection of data. In short we can conclude that there are several research designs and the researcher must decide in advance about the type of design which he will find it most appropriate for his research project.

2.7.3 Steps in Research Design

1. Formulation of research problem

The initial stages of research are the formulation of a research problem and the selection of the type of study.

2. Survey of literature

A thorough and analytical review of previous studies related to the problem may be done along with the stating and defining of the research problem.

3. The conceptual framework

It is the process of giving clear and precise meaning and accepted definition to various concepts and variables used in the area of research undertaken.

4. Formulation of research issues/questions

Once a research problem is formulated, the researcher has to raise a series of research questions or statements to suit the problem which form the basis of further analytical investigation.

5. Transformation of research questions to specific objectives

By the term research objective(s) is meant the specific proposition that is the subject of investigation. The research questions or statements arrived at may be converted as important objectives of the study. For each research issue a corresponding objective can be framed.

6. Transformation of objectives into research hypotheses

The work “hypo” means under or below and ‘thesis’ means a reasoned theory. Hence, hypothesis denotes a theory which is not fully reasoned. It is a proposition which can be put to test its validity. Hypothesis is a predictive statement that relates an independent variable to a dependent variable. Hypothesis guides the line of investigation and aids to single out pertinent facts and keeps the researcher on the right track. Without a hypothesis much useless data will be collected. In the absence of hypotheses are drawn either from theories or from findings of other people**.**

7. Coverage

The scope and coverage of the study is to be clearly determined. It includes the area of study, the period of study, the number of observations, etc. The researcher must also decide which cases (people) are to be included as subjects in the study i.e., a sampling plan.

8. Data requirement and data source

The different type of data required for the analysis and its sources to be clearly specified. The sources of information are wide, i.e., documentary and or field source. They are also very wide. The selection of the appropriate data depends on the type of information required which again is based on the nature, scope and object of enquiry

9. Analytical framework and tools of analysis

The statistical techniques used for establishing the relationships between the data and the unknowns and methods used to evaluate the accuracy of results i.e., the analytical tools of research are very important for scientific analysis of the problem. The design of the methodology and its aptness in the context of the particular research study are the most important parts of a scientific and systematic research.

10. Statement of the limitations of the study

The time allowed for a study and a series of restrictions that may crop up during the course of the investigation impose reasonable limitations on each study. A clear statement of the limitations of the study is also a proof of scholarly writing. The research problem under study should also be limited concentrating on important information and essential details.

11. The chapter outline

The preparation of a chapter outline is a useful step in preparation of a draft outline of the thesis. It stands as a guide or planning the thesis. There is no set or standardized model though most of the researchers follow a standard format. The introductory chapter is followed by a survey of literature. The chapters dealing with the body of the thesis vary according to the purpose and the problem of the study. The empirical study deals with analytical framework including procedures, techniques, hypotheses, samples, tests, etc. In the case of analytic search the chapter division is based on chronological development. The final chapters are devoted for ‘implications and conclusions’, ‘recommendations’, and summary. There will be appendices (both technical and nontechnical) and bibliography.

12. The budgeting and cost estimation

Since the research design is the planned sequence of entire process the task will be over only by time budgeting and cost estimation. The research purpose can be achieved with minimum expenditure of money, time and energy through proper time schedule.

13. Significance Of Research Design

Research design offers the investigator an opportunity to carry out different research operations efficiently. This makes research as valuable as possible producing maximum information with minimum effort, time and money. Researcher needs to consider all necessary precautions when preparing the design, as any error may upset the whole project. The reliability of result, which a researcher is looking, is proportional with a good design that constitutes a firm foundation of entire body of research work. Research design carries an important influence on the reliability of results attained. It provides a solid base for the whole research. It is needed due to the fact that it allows for the smooth working of the many research operations. Research design stands for advance planning of the methods to be adopted for collecting the relevant data and the techniques to be used in their analysis.

1.8 SUMMARY

Finally, we have come to a conclusion of our unit of familiarizing you with the meaning of research. Research is a movement from known to unknown. Commonly speaking it refers to the search for knowledge. Research is actually an act of studying something carefully and extensively in order to attain deep knowledge in the same. The objective of research is to find out answers to innumerable query or discover the hidden truth through the application of scientific procedures. Nevertheless each research study has its own specific purpose. There are many types of research also. This may be classified into several categories according to the nature and purpose of the study and other attributes. Descriptive Research, Analytical Research, Applied Research and Fundamental Research are a few of them. Increased amount of research makes progress of a country possible. If a researcher wants his researches to be a successful one he should be careful about his investigation. To qualify as research, the process must have certain characteristics such as, it must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical and critical.

In recent years the prevalence of plagiarism has been increasing. It may be attributed to internet facility. Hence many ideas and works of others mingle easily into someone else's own research work.

1.9 CHECK YOUR PROGRESS/ EXERCISE

1. True False

a. Research refers to a search for knowledge.

b. Research provides the basis for all government policies.

c. Research is unable to solve any operational and planning problems of business and industry.

d. In the research design the researcher should mention the method of obtaining information and amount of money only required.

e. For analysis of data the researcher need to carry on coding, tabulation and use statistical techniques.

2. Fill in the blanks

a. Research is often referred to as '_____ inquiry'.

b. Testing a _____ is known as hypothesis testing research.

c. _____ of a research refers to the level of certainty in the results of a study.

d. _____ Research means a data based research which only depends on experience and observation.

e. Historical research the _____ records.

3. Multiple choice question

a. Research is conducted
i. to develop and evaluate concepts of determinism.
ii. to monitor the progress of tourism.
iii. to develop and evaluate concepts and theories.

b. Exploratory or formulative research is
i. gaining familiarity with a phenomenon to achieve new ideas.
ii. testing a hypothesis.
iii. finding out the frequency with which something occurs.

c. Research is necessary for allocation
i. of nation's resources.
ii. of chocolates for children.
iii. of hospitality.

d. The role of the hypothesis is to
i. guides the teachers and keeps them busy.
ii. guide the researcher and keep him on the right track.
iii. guide the hotelier and teach him how to cook.

e. In the case of survey the data can be collected in the following ways:
i. by observation, through chi – square test, t – test, f –test.
ii. by coding, tabulation and statistical techniques
iii. by observation, through personal interview, through telephonic interview

4. Answers the following Questions

1. What do you understand by the term research?
2. What are the objectives of research?
3. What is the significance of research?

4. Write a short note on:

a. structure of research.

b. types of research

c. plagiarism

5. State the motivation of research.

6. Describe utility of research.

7. What is meant by ethical consideration in research?

8. Are there issues and problems in research? Justify your answer.

1.10 ANSWERS TO THE SELF LEARNING QUESTIONS

1. a.true

2. b. true

1. c. false, Research has a special significance in solving various operational and planning problems of business and industry.

1. d. false, In the research design the researcher should mention the method of obtaining information, amount of man power required and definitely the time and the cost.

1.e.true

2.a. scientific

2.b. hypothesis

2.c. Significance

2.d. Empirical

2.e. past

3.a.iii.

3.b.i

3.c.i.

3.d.ii

3.e.iii

1.11 TECHNICAL WORDS

1. **Research**- the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions

2. **Hypothesis**- a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation

3. **Chi–Square Test**- a statistical method assessing the goodness of fit between a set of observed values and those expected theoretically.

4. **T-Test- it** is an analysis of two populations means through the use of statistical examination

5. **F-Test**- it is any statistical test in which the test statistic has an F-distribution under the null hypothesis

1.12 TASK

1. In a chart draw a column and compare different type of research.

1.13 REFERENCES FOR FURTHER STUDY

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2

DATA COLLECTION AND DATA PROCESSING

Unit Structure :

2.0 After going through this chapter you will be able to understand the following features:

2.1 Objectives

2.2 Introduction

2.3 Subject discussion

2.4 Sample design, measurements, scaling Data collection in geography - Types and sources of data

2.5 Types of Data

2.6 Sources of Primary Data

i. Observation

ii. Questionnaire survey

iii. Schedule

iv. Interview

2.7 Sources of Secondary Data

2.8 Data processing

i. Editing

ii. Coding

iii. Classification

iv. Tabulation,

2.9 Summary

2.10 Check your progress/exercise

2.11 Answers to the self learning questions

2.12 Technical words and their meaning

2.13 Task

2.14 References for further study

2.1 OBJECTIVE

By the end of this unit you will be able to:

- Understand the types and sources of Primary and Secondary data
- Discuss and Learn Stages in data processing by Editing, Coding, Classification, and Tabulation
- Understand Data analysis with statistical package by the help of
- Excel and SPSS
- Learn Diagrammatic representation
- Understand Interpretation of data

2.2 INTRODUCTION

In the first unit we have learnt what is meant by research, its objective, structure, significance, motivation, and utility, evaluation of the ethical consideration in research and plagiarism. In the second unit the meaning of research methodology is studied along with stages in scientific research processes and the identification, selection and formulation of research problems. This was followed by the discussion on Review of literature, Hypotheses, Research design and Sample design and an elaborate discussion on Qualitative research and Quantitative research. In the present unit we are going to study the definition of data and different types and sources of Primary and Secondary data at first. The Advantages and Disadvantages of these will also be learnt. Next in the discussion come the Sources of Primary and Secondary Data. Furthermore Stages in data processing by Editing, Coding, Classification, and Tabulation, Data analysis with statistical package by the help of Excel and SPSS, Diagrammatic representation and Interpretation of data will be the topic of discussion in the latter part of this unit.

2.3 SUBJECT-DISCUSSION

21st century students know to read and understand research literature critically. The students learn statistical concepts, interpret statistical results, and write critical analyses of journal articles. Several research studies are undertaken and accomplished year after year. Data is short hand for “information” and researchers turn to data because they have a problem to solve. Most of them start with a question, and then look to data for answers. In a service setting, questions might include, “who is receiving services?” and “who does best in treatment?” Sometimes the results tell a different story than the ones we set out to tell. So, it is important to be open to unexpected patterns, explanations, and unusual results whenever we look at data.

Data is used to describe things by assigning a value to them. The values are then organized, processed, and presented within a given context so that it becomes useful. Data is analyzed using statistics and frequencies tell us how many times the answer or value has occurred.

A point must be noted that many factors can affect statistical significance, including sample size. Small sample sizes can affect data analysis and interpretation, particularly when using percentages. Data analysis refers to a variety of specific procedures and methods and involves goals; relationships; decision making; and ideas, in addition to working with the actual data itself. There are many different ways of conceptualizing the data analysis process.

2.4 SAMPLE DESIGN

A sample design is a precise plan determined before actual collection of any data to obtain a sample from a given population. It is very popular in research work. Sample designs can be either probability or non-probability. Here a small group is selected as representative of the whole universe. Its objective is to obtain accurate and reliable information and make exhaustive and intensive study about the universe involving minimum cost, time, money, material and energy. Population or universe means, the entire mass of observations, which is the parent group from which a sample is to be formed. In Research Methodology population means characteristics of a specific group. Secondary school teachers who have some specific features like teaching experience, teaching attitudes may be taken as an example. By observing the characteristics of the sample, one can make certain inferences about characteristics of the population from which it is drawn.

2.4.1 Following are the Need of Sampling:

a. Economy of time

b. Economy of money

c. True detailed knowledge

d. Utility in experimental study

2.4.2 Advantages of Sampling:

a. It has a greater adaptability.

b. It is an economical technique.

c. It has high speed for generalization.

d. According to W.G. Cocharan, “It has greater precision and accuracy in the observation”.

e. This technique has great accuracy.

f. It has a greater speed in conducting a research work.

g. It has a greater scope in the field of research.

h. It reduces the cost of observation or data collection.

2.4.3 Disadvantages of Sampling:

a. Scope of biasness.(Less accuracy)

b. Problem of representative sample-Difficulty in selecting a truly representative sample.

c. Need of eligible researchers.

d. Instability of sample subjects or changeability of units i.e. in heterogeneous population.

e. There are certain situations where sampling is possible.

DATA COLLECTION IN GEOGRAPHY (TYPES AND SOURCES OF DATA)

Scientists attempt to answer questions using rigorous methods and attentive observations. These observations are a collection of field notes, surveys, and experiments. They are called data and form the backbone of a statistical investigation. The researcher collects information about various types of data available in library databases. He then selects which databases he can use to locate a certain type of data.

2.5 TYPES OF DATA

- **Definition of Data**

Data are values of qualitative or quantitative variables, belonging to a set of items. Data is analyzed to create information suitable for making decisions. Data collection is most important stage in a research. Best research design fails without suitable data. Data collection needs planning, hard work and patients.

2.5.1 Data is broadly classified into following types

1. **Primary data**
2. **Secondary data**

1. Primary Data:

This is the first hand information collected, compiled and published by individual or organization. This data is the original and have not undergone any sought of statistical treatment. It is collected from the field.

2. Secondary Data:

This is the second hand information, which is already collected by someone for some other purpose. This data is not pure in character and have undergone some treatment at least once.

2.5.1.1 Advantages and Disadvantages of Primary Data

- **Advantages of Primary Data**

a. Most reliable
b. Direct interaction
c. Most unbiased
d. Possible to get back ground information
e. Possible to collect as per requirement

- **Disadvantages of Primary Data**

a. Usually expensive
b. Takes more time
c. Will create false result if not collected properly.
d. Skill and expertise of researchers matters a lot.
e. Comprehension potential of the respondents is a major issue.

2.5.1.2 Advantages and Disadvantages of Secondary Data

- **Advantage of Secondary Data**

a. It is economical
b. It saves efforts
c. It is time saving
d. It helps makes primary data more specified
e. It helps to improve the understanding of the problem
f. It provides the basis for comparison for the data that is collected by the researcher.

- **Disadvantages of Secondary Data**

a. The data collected earlier is of no use to you.
b. Accuracy of secondary data is not known.
c. Data may be out dated.

2.6 SOURCES OF PRIMARY DATA

2.6.1 Observation

Observation is a complex research method. The observer puts himself in the actual situation and records the activities and behaviour of the sample population. Sometimes the observer becomes the member of the community being studied. On the basis of his knowledge, skills and experience he collects the data without contacting the respondents. The results of observation entirely depend on the talents of the researcher. This

method can be used only by expert persons in the research. Observation methods have been developed with the objective of observing people in their natural setting - as they go about their everyday lives.

2.6.2 Questionnaire

Questionnaire is a set of questions which is prepared to ask a number of questions and collect answers from respondents relating to the research topic. The questions are usually in printed or electronic form is to be answered by the individuals. The forms often have blank spaces in which the answers can be written. Sets of such forms are distributed to the groups and the answers are collected relating to research topic. When properly constructed and responsibly administered, questionnaires become a vital instrument by which statements can be made about specific groups or people or entire populations.

Questionnaires can be administered in many ways: by post, via e-mails, face-to-face, or by telephone. Nevertheless, each one of these methods has got its shortcomings. For instance, posted and e-mailed questionnaires might not receive replies, or the provided answers might be poor because of the lack of interaction between the questionnaire giver and taker. Moreover, face-to-face or telephone questionnaires are time consuming and sometimes costly. It is thus up to the researcher to decide for the method according to his/her means and capabilities. Either way, while distributing questionnaires, it is crucial that one always introduces him/herself, presents the goal of the questionnaire, provides any contact details and is ready to answer any possible queries about it.

2.6.2.1 The main merits of this method are

a. It is low cost even when the universe is large and is widespread geographically.
b. It is free from bias of interviewer as answers are respondent's own words.
c. Respondents, who are not easily approachable, can also be reached conveniently.
d. Moreover, respondents are given enough time to give well thought answers.

2.6.2.2 The main demerits of this method are:

a. Low rate of return of the duly filled questionnaires.
b. It can be used only when the respondents are educated and cooperative.
c. The control of the questionnaire may be lost once it is sent.
d. It is difficult to know whether willing respondents are truly representative.
e. This method is likely to be the slowest of all.

2.6.3 Schedule

Here the questionnaires are sent through the enumerators to collect information. Enumerators are persons appointed by the investigator for the purpose. They directly meet the informants with the questionnaire. They explain the scope and objective of the enquiry to the informants and solicit their cooperation. The enumerators ask the questions to the informants and record their answers in the questionnaire and compile them. The success of this method depends on the sincerity and efficiency of the enumerators. So the enumerator should be sweet-tempered, good-natured, trained and well-behaved. Schedule method is widely used in extensive studies. It gives fairly correct result as the enumerators directly collect the information. The accuracy of the information depends upon the honesty of the enumerators. They should be unbiased. This method is relatively more costly and time- consuming than the mailed questionnaire method.

2.6.4 Interview

Here the researcher asks questions to an individual or to a group of persons. There are different types of interview. In personal interview, the researcher asks questions in a face to face contact. In telephonic interviews, the researcher contacts the samples on telephones. Another method is the focus group, which allows for interviewing groups together and observing the interaction between them as well. Interviews can be done formally (structured), semi- structured, or informally. The questions should be focused and clear. Interviews are mainly qualitative in nature.

2.7 SOURCES OF SECONDARY DATA

- Following are the sources of secondary data.
  a. Focused internet sources.
  b. Government published data.
  c. Competitor information.
  d. Multi-client reports
  e. Industry trade media
  f. Industry reports
  g. Media and personal sources
  h. Previous research
  i. Official statistics
  j. Diaries
  k. Letters
  l. Historical data and information

2.8 STAGES IN DATA PROCESSING

Data processing is simply the conversion of raw data to meaningful information through a process. Data is manipulated to produce results that lead to a resolution of a problem or improvement of an existing situation. Similar to a production process, it follows a cycle where inputs (raw data) are fed toprocess (computer systems, software, etc.) to produce output (information and insights).

1. Editing

Editing is the first step in **data processing**. Editing is the process of examining the data collected in questionnaires/ schedules to detect errors and omissions and to see that they are corrected and the schedules are ready for tabulation.

2. Coding

Coding is necessary for efficient analysis and through it several replies may be reduced to a small number of classes which contain the critical information required for analysis. Coding decisions should usually be taken at the designing stage of the questionnaire. This makes it possible to pre-code the questionnaire choices and which in turn is helpful for computer tabulation as one can straight forward key punch from the original questionnaires. But in case of hand coding some standard method may be used. One such standard method is to code in the margin with a colored pencil. The other method can be used to transcribe the data from the questionnaire to a coding sheet. Whatever method is adopted, one should see that coding errors are altogether eliminated or reduced to the minimum level.

2. Classification of Data

Classification or categorization is the process of grouping the statistical data under various understandable homogeneous groups for the purpose of convenient interpretation. A uniformity of attributes is the basic criterion for classification; and the grouping of data is made according to similarity. A good classification should have the characteristics of clarity, homogeneity, equality of scale, purposefulness and accuracy.

4. Tabulation of Data

Tabulation is the process of summarizing raw data and displaying it in compact form for further analysis. Therefore, preparing tables is a very important step. Tabulation may be by hand, mechanical, or electronic. The choice is made largely on the basis of the size and type of study, alternative costs, time pressures, and the availability of computers, and computer programmes. If the number of questionnaire is small, and their length short, hand tabulation is quite satisfactory.

- Table may be divided into:

a. Frequency tables,

b. Response tables,

c. Contingency tables,

d. Uni-variate tables,

e. Bi-variate tables,

f. Statistical table

g. Time series tables.

- Generally a research table has the following parts:

a. Table number

b. Title of the table

c. Caption

d. Stub (row heading)

e. Body

f. Head note

g. Foot note

2.9 SUMMARY

Finally, we have come to the end of this unit. We have learnt the definition of data and types and sources of primary and secondary data. Data is raw or unorganized information like symbols, numbers, or alphabets that refers to, or represents, conditions, ideas, or objects. Primary Data is the first hand information collected while Secondary Data is the second hand information, which is already collected by someone for some other purpose. Both of these have some advantages and disadvantages. Researchers need to consider the sources of data on which they can base and confirm their research and findings. They have a choice between primary data and secondary sources and the use of both. Observation, questionnaire survey, schedule and interview are the common sources of primary data. Secondary sources are data that already exists in previous research, official statistics, government reports, web information, and historical data. Next come data processing which is simply the conversion of raw data to meaningful information through a process. There is a wide range of approaches, tools and techniques to process data, and it is important to start with the most basic understanding of it. Editing is the first step in data processing followed by coding, classification ofData and Tabulation of Data. Data Analysis is done with statistical packages like Microsoft Excel and SPSS. The software Microsoft Excel is developed and manufactured by Microsoft Corporation. It allows users to organize, format, and calculate data with

formulas using a spreadsheet system. This spreadsheet is broken up by rows and columns. SPSS or Statistical Package for the Social Sciences is a computer application that supports statistical analysis of data. It allows for comprehensive data access and preparation. It is one of the most popular statistical packages which can perform highly complex data manipulation and analysis with simple instructions. Furthermore data is more effectively presented with the help of diagrams such as charts and graphs. Last but not the least; data interpretation is part of daily life for most people. Interpretation is the process of making sense of numerical data that has been collected, analyzed, and presented. However we should remember that presentation of the findings should not overstate the evidence.

2.10 CHECK YOUR PROGRESS/ EXERCISE

1. True False

a. Observation forms the backbone of a statistical investigation. b. No planning is needed for Data collection.

b. Primary Data the second hand information.

c. Primary Data is most reliable, most unbiased and possible to collect as per requirement.

d. Coding decisions should usually be taken at the designing stage of the questionnaire.

2. Fill in the blanks

a. _____data is not pure in character and have undergone some treatment at least once.

b. _____ data is usually expensive and takes more time.

c. Accuracy of _____data is not known.

d. _____can be administered by post, via e-mails, face-to-face, or by telephone.

e. SPSS is a _____based program that can be used toperform data entry and analysis and to create _____ graphs.

f. Excel belongs to the group of computer applications known as _____.

g. Editing is the first step in _____ _____.

h. One standard method is to code in the margin with a _____ pencil.

i. _____is the process of summarizing raw data and displaying it in compact form for further analysis.

j. _____ of the Data enables the researcher to have an in–depth knowledge about the abstract principle behind his own findings.

2. Multiple choice question

a. Data are

i. values of independent variable or quantitative variables, belonging to a set of items.

ii. values of qualitative or quantitative variables, belonging to a set of items.

iii. values of qualitative or dependent variables, belonging to a set of items.

b. Data is broadly classified into

i. Secondary data and tertiary data

ii. Primary data and tertiary data

iii. Primary data and Secondary data

c. Secondary Data is

i. economical, saves efforts, time saving and makes primary data more specified.

ii. collected earlier, thus very useful and accuracy is well known.

iii. original and have not undergone any sought of statistical treatment.

d. Disadvantages of Primary Data

i. skill and expertise of researchers matters a lot.

ii. data may be out dated.

iii. possible to collect as per requirement.

e. A graph gives relationship between

i. multiple variables by means of a curve.

ii. two variables by means of either a square or a straight line.

iii. two variables by means of either a curve or a straight line.

4. Answers the following Questions

1. Define data. Classify data.
2. Make a comparative study between advantages and disadvantages of primary data and secondary data.
3. State the sources of Primary Data.
4. What are the merits and de merits of Questionnaire?
5. What are the sources of Secondary Data?
6. Describe the stages in data processing.
7. What do you understand by interpretation of data? "In Research Methodology interpretation of the data has a very important role"- explain.

8. Write short notes on:
   a. SPSS
   b. Tabulation of Data
   c. Interview
   d. Observation
   e. Interpretation of Data

2.11 ANSWERS TO THE SELF LEARNING QUESTIONS

1.a. false, Data

1.b. false, Data collection needs planning, hard work and patients.

1.c. false, Secondary Data is the second hand information.

1.d.true

1.e.true

2.a. Secondary data

2.b. Primary data

2.c. secondary

2.d. Questionnaires

2.e. Windows, tables

2.f. spread sheets

2.g. data processing

2.h. coloured

2.i. Tabulation

2.j. Interpretation

2.a.ii.

2.b.iii.

2.c.i.

2.d.i.

2.e.iii.

2.12 TECHNICAL WORDS

1. **Coding**-the process of assigning a code to something for classification or identification.
2. **Graph**-Two-dimensional drawing showing a relationship, usually between two set of numbers, by means of a line, curve, a series of bars
3. **Interpretation**- is the act of explaining, reframing, or otherwise showing one's own understanding of something.

4. **Questionnaire**-a set of printed or written questions with a choice of answers, used for the purposes of a survey or statistical study
5. **Tabulating-**is a way of processing information or data by putting it in a table or chart, with rows and columns.

2.13 TASK

1. In a chart draw a column and compare between the merits and demerits of Questionnaire.
2. In a chart write down the advantages and disadvantages of primary data using bullets.

2.14 REFERENCES FOR FURTHER STUDY

1. Research Methodology Practice – P. Philominathan – Shri A.V.V.M. Pushpam College – Poondi –Thanjavar
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11. Data Just Right: Introduction to Large-Scale Data & Analytics by Michael Manoochehri
12. Marketing Analytics: Data-Driven Techniques with Microsoft Excel by Wayne Winston.

3

DATA ANALYSIS

Unit Structure :

3.0 After going through this chapter you will be able to understand the following features:

3.1 Objectives

3.2 Introduction

3.3 Data analysis- meaning, types of significance

3.4 Data Analysis With Statistical

3.5 Hypothesis

3.6 Summary

3.7 Technical words and their meaning

3.8 Task

3.9 References for further study

3.1 OBJECTIVE

By the end of this unit you will be able to:

- Understand the data analysis process
- Discuss and Learn Stages in data processing by Editing, Coding, Classification, and Tabulation
- Understand Data analysis with the statistical package by the help of
- Excel and SPSS
- Learn Diagrammatic representation
- Understand Interpretation of data

3.2 INTRODUCTION

In the first unit we have learnt what is meant by research, its objective, structure, significance, motivation, and utility, evaluation of the ethical consideration in research and plagiarism. In the second unit the meaning of research methodology is studied along with stages in scientific research processes and the identification, selection and formulation of research problems. This was followed by the discussion on Review of literature, Hypotheses, Research design and Sample design and an

elaborate discussion on Qualitative research and Quantitative research. In the present unit we are going to study the definition of data and different types and sources of Primary and Secondary data at first. The Advantages and Disadvantages of these will also be learnt. Next in the discussion come the Sources of Primary and Secondary Data. Furthermore Stages in data processing by Editing, Coding, Classification, and Tabulation, Data analysis with statistical package by the help of Excel and SPSS, Diagrammatic representation and Interpretation of data will be the topic of discussion in the latter part of this unit.

SUBJECT-DISCUSSION

21st century students know to read and understand research literature critically. The students learn statistical concepts, interpret statistical results, and write critical analyses of journal articles. Several research studies are undertaken and accomplished year after year. Data is short hand for "information" and researchers turn to data because they have a problem to solve. Most of them start with a question, and then look to data for answers. In a service setting, questions might include, "who is receiving services?" and "who does best in treatment?" Sometimes the results tell a different story than the ones we set out to tell. So, it is important to be open to unexpected patterns, explanations, and unusual results whenever we look at data.

Data is used to describe things by assigning a value to them. The values are then organized, processed, and presented within a given context so that it becomes useful. Data is analyzed using statistics and frequencies tell us how many times the answer or value has occurred. A point must be noted that many factors can affect statistical significance, including sample size. Small sample sizes can affect data analysis and interpretation, particularly when using percentages. Data analysis refers to a variety of specific procedures and methods and involves goals; relationships; decision making; and ideas, in addition to working with the actual data itself. There are many different ways of conceptualizing the data analysis process.

3.3 DATA ANALYSIS – MEANING TYPES , SGNIFICANCE

WHAT IS THE DATA ANALYSIS?

Data analysis is a process for obtaining raw data, and subsequently converting it into information useful for decision-making by users. Data is collected and analyzed to answer questions, test hypotheses, or disprove theories.

Types of Data Analysis:

Descriptive analysis

Descriptive analysis tells us what happened. This type of analysis helps describe or summarize quantitative data by presenting statistics. For example, descriptive statistical analysis could show the distribution of sales across a group of employees and the average sales figure per employee.

Descriptive analysis answers the question, "what happened?"

Diagnostic analysis

If the descriptive analysis determines the "what," diagnostic analysis determines the "why." Let's say a descriptive analysis shows an unusual influx of patients in a hospital. Drilling into the data further might reveal that many of these patients shared symptoms of a particular virus. This diagnostic analysis can help you determine that an infectious agent—the "why"—led to the influx of patients.

Diagnostic analysis answers the question, "why did it happen?"

Predictive analysis

So far, we've looked at types of analysis that examine and draw conclusions about the past. Predictive analytics uses data to form projections about the future. Using predictive analysis, you might notice that a given product has had its best sales during the months of September and October each year, leading you to predict a similar high point during the upcoming year.

Predictive analysis answers the question, "what might happen in the future?"

Prescriptive analysis

Prescriptive analysis takes all the insights gathered from the first three types of analysis and uses them to form recommendations for how a company should act. Using our previous example, this type of analysis might suggest a market plan to build on the success of the high sales months and harness new growth opportunities in the slower months.

Prescriptive analysis answers the question, "what should we do about it?"

This last type is where the concept of data-driven decision-making comes into play.

Significance of data analysis:

- Better Customer Targeting: You don't want to waste your business's precious time, resources, and money putting together advertising campaigns targeted at demographic groups that have little to no interest in the goods and services you offer. Data analysis helps you see where you should be focusing your advertising and marketing efforts.

- You Will Know Your Target Customers Better: Data analysis tracks how well your products and campaigns are performing within your target demographic. Through data analysis, your business can get a better idea of your target audience's spending habits, disposable income, and most likely areas of interest. This data helps businesses set prices, determine the length of ad campaigns, and even help project the number of goods needed.

- Reduce Operational Costs: Data analysis shows you which areas in your business need more resources and money, and which areas are not producing and thus should be scaled back or eliminated outright.

- Better Problem-Solving Methods: Informed decisions are more likely to be successful decisions. Data provides businesses with information. You can see where this progression is leading. Data analysis helps businesses make the right choices and avoid costly pitfalls.

- You Get More Accurate Data: If you want to make informed decisions, you need data, but there's more to it. The data in question must be accurate. Data analysis helps businesses acquire relevant, accurate information, suitable for developing future marketing strategies, and business plans, and realigning the company's vision or mission.

3.4 DATA ANALYSIS WITH STATISTICAL

a. Microsoft Excel

Excel belongs to the group of computer applications known as spread sheets. Microsoft Excel helps to present the data in almost any way the researcher chooses. Excel can also be used as a sophisticated calculator. It is capable of utilizing complex mathematical formulas. It can also be diary, a scheduler, and many more.

Excel facilities the use of colour, border and different fonts to represent data. A variety of charts are available, which can be selected to represent the data.

b. SPSS

SPSS is a Windows based program that can be used to perform data entry and analysis and to create tables and graphs. SPSS is capable of handling large amounts of data and can perform all the analyses covered in the test and much more. SPSS is commonly used in the Social Sciences and in the business world.

SPSS is updated often. The software was released in its first version in 1968 as the Statistical Package for the Social Sciences (SPSS).It is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others.

6. Data Diagrams

Diagrams are charts and graphs used to present data. These help presenting data more effectively. Creative presentation of data is possible. The data diagrams classified into:

Charts: A chart is a diagrammatic form of data presentation. Bar charts, rectangles, squares and circles can be used to present data. Bar charts are uni-dimensional, while rectangular, squares and circles are two-dimensional.

Graphs: The method of presenting numerical data in visual form is called graph. A graph gives relationship between two variables by means of either a curve or a straight line. Graphs may be divided into two categories. (1) Graphs of Time Series and (2) Graphs of Frequency Distribution. In graphs of time series one of the factors is time and other or others is / are the study factors. Graphs on frequency show the distribution of by income, age, etc. of executives and so on.

7. Interpretation of Data

After collection of data from survey results, experimental findings, observations or narrative reports it is analysed by the researchers. This step enables the researcher to interpret the results. Thus Data analysis and interpretation is the process of assigning meaning to the collected information and determining the conclusions, significance, and implications of the findings. The purpose of analysis and interpretation of data is to obtain usable and useful information. The analysis, irrespective of whether the data is qualitative or quantitative, may describe the data and identify relationships between variables. It may also compare variables; identify the difference between variables and forecast outcomes. Experimental scientists base their interpretations largely on objective data and statistical calculations. Social scientists interpret the results of written reports that are rich in descriptive detail but may be devoid of mathematical calculations. In Research Methodology Interpretation of the Data has a very important role.

- The following factors describe why this is considered as an essential process:

1. It enables the researcher to have in–depth knowledge about the abstract principle behind his own findings.
2. The researcher is able to understand his findings and the reasons behind their existence.
3. More understanding and knowledge can be obtained with the help of the further research.
4. It provides a very good guidance in the studies relating to the research work.
5. Sometimes may result in the formation of the hypothesis.

By far it has been known that Data interpretation is the most important key to prove or disprove one's hypothesis. Hence it is important to select

the proper statistical tool to make useful interpretation of one's data. If an improper data analysis method is taken, the results may lack credibility.

3.5 HYPOTHESIS

A hypothesis is a specific, testable prediction. It is the proposed assumption which needs to be proved or disapproved. Hypothesis generally is tested by scientific methods. If hypothesis is proved the solution can be formed. In traditional practice two hypotheses are set. If one hypothesis is rejected then the other hypothesis is accepted. Hypothesis should be clearly stated.

2.5.1 The two hypotheses are-

1. **Null Hypothesis**- The null hypothesis (H_0) is a hypothesis which the researcher tries to disprove, reject or nullify. A null hypothesis is the hypothesis where there is no relationship between two or more variables, symbolized as H_0.

2. **Alternative Hypothesis** - The alternate, or research, hypothesis proposes a relationship between two or more variables, symbolized as H_1.

2.5.2 Procedure of Testing Hypothesis:

The procedure of testing hypothesis is briefly described below:

1. Set up a Hypothesis

The first thing in hypothesis testing is to set up a hypothesis about a population parameter. Then we collect sample data, produce sample statistics and use this information to decide how likely it is that our hypothesized population parameter is correct.

2. Set up a Suitable Significance Level

Having set up, the hypothesis, the next step is to test the validity of H_1, against that of H_a at a certain level of significance. The confidence with which as experimenter rejects – or retains – a null hypothesis depends upon the significance level adopted.

3. Setting a Test Criterion

The third step in hypothesis testing procedure is to construct a test criterion. This involves selecting an appropriate probability distribution for the particular test, test is, a probability distribution which can properly be applied. Some probability distributions that are commonly used in testing procedures are T, F, and X^2. Test criteria must employ an appropriate probability distribution; for example, if only small sample information is available, the use of the normal distribution would be inappropriate.

4. Doing Computations

Having taken the first three steps, we have completely designed a statistical test. We now proceed to the fourth step – performance of various computations–from a random sample to size n, necessary for the test. These calculations include the testing statistic and the standard error of the testing statistic.

5. Making Decisions

Finally, as a fifth step, we may draw statistical conclusions and take decisions. A statistical decision is a decision either to reject or to accept the null hypothesis.

2.5.3 There are 2 types of errors to be noted here

1. Type (I) that means rejecting the Null hypothesis that is true.
2. Type (II) error when it is not possible to reject a false Null hypothesis.

Some researchers believe that it is not essential to develop a hypothesis. But it has been proved that hypothesis brings clarity in research. However, hypothesis should always be simple, specific and clear. For example, the hypothesis is "The age of the male students in this class is higher than that of the female students." This hypothesis is clear and specific and is easy to test. Thus, we can say hypothesis are important for bringing clarity and focus to a research study.

3.6 SUMMARY

Finally, we have come to the end of this unit. We have learnt the definition of data and types and sources of primary and secondary data. Data is raw or unorganized information like symbols, numbers, or alphabets that refers to, or represents, conditions, ideas, or objects. Primary Data is the first hand information collected while Secondary Data is the second hand information, which is already collected by someone for some other purpose. Both of these have some advantages and disadvantages. Researchers need to consider the sources of data on which they can base and confirm their research and findings. They have a choice between primary data and secondary sources and the use of both. Observation, questionnaire survey, schedule and interview are the common sources of primary data. Secondary sources are data that already exists in previous research, official statistics, government reports, web information, and historical data. Next come data processing which is simply the conversion of raw data to meaningful information through a process. There is a wide range of approaches, tools and techniques to process data, and it is important to start with the most basic understanding of it. Editing is the first step in data processing followed by coding, classification of

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3.7 TECHNICAL WORDS

1. **Coding**-the process of assigning a code to something for classification or identification.
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3.8 TASK

1. In a chart draw a column and compare between the merits and demerits of Questionnaire.
2. In a chart write down the advantages and disadvantages of primary data using bullets.

3.9 REFERENCES FOR FURTHER STUDY

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11. Data Just Right: Introduction to Large-Scale Data & Analytics by Michael Manoochehri
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4

RESEARCH REPORT WRITING

Unit Structure :

4.0. After going through this chapter you will be able to understand the following features:

4.1 Objectives

4.2 Introduction

4.3 Subject discussion

4.4 Structure of scientific reports

4.5 Types of report

4.6 Different steps in the preparation

4.7 Layout, structure of typical reports

4.8 Language of typical reports

4.9 Illustrations and tables

4.10 Bibliography,

4.11 Referencing and footnotes

4.12. Plagiarism

4.13 Summary

4.14 Check your progress/exercise

4.15 Answers to the self learning questions

4.16 Technical words and their meaning

4.17 Task

4.18 References for further study

4.1 OBJECTIVES

By the end of this unit you will be able to:

- Understand the meaning and structure of scientific reports
- Discuss different types of report
- Learn different steps in the preparation of scientific reports

- Evaluate the layout, structure of typical reports
- Learn the language of typical reports
- Know about the illustrations and tables
- Understand bibliography
- Know referencing and footnotes

4.2 INTRODUCTION

In the previous units we have studied about the meaning of research, its objective, structure, significance, etc. We have learnt about the research methodology also. This was followed by the discussion on Review of literature, Hypotheses, Research design and Sample and many other related topics. In the last unit we discussed about the definition of data and different types and sources of Primary and Secondary data, Data analysis with statistical package by the help of Excel and SPSS etc. In the present chapter we will be studying the meaning and structure of scientific reports and its different types. Different steps in the preparation of scientific reports will also be learnt along with the layout, structure and the language of typical reports. The illustrations, tables, bibliography and referencing and footnotes will be discussed in the latter part of this unit.

4.3 SUBJECT-DISCUSSION

Till now we have learnt about research methodology and various stages in scientific research processes. Down the ages through these processes researchers have done innumerable scientific experiments which are quite demanding. But to have an impact of these exciting endeavors the results and conclusions must be communicated to others. A scientific report is a method of communication. It is a written and published report describing original research results. Unlike an essay, this report has a definite structure or shape. Moreover a scientific paper must have a valid publication that is published in the right place, usually in a primary journal. An excellently prepared research report loses its validity if published in the wrong place. Every scientific paper must have a self-explanatory title so that the reader has a clear idea about the work being reported by reading the title only. In the introduction the reader will find enough information about the investigated problem. In this part of the scientific paper the reader has the scope to appreciate the researcher's specific objectives within a larger theoretical framework. There are various types of research report containing key aspects of research project. Scientists may consult these during the course of their work. Although research reports vary greatly in length and type there is no one best format for all reports. Format of research report depends on several relevant variables.

4.4 STRUCTURE OF SCIENTIFIC REPORT

4.4.1 Definition of report

A report is a statement of facts and figures, prepared for the purpose of information and action. The Oxford Dictionary defines a report as "a record of ascertained facts". A report is a formal statement of the result of an investigation of any matter on which definite information is required, made by some person or body, instructed to do so.

American Marketing Society states that the purpose of report is "to convey to the interested persons the whole result of the study in sufficient detail and so arranged as to enable each reader to comprehend the data and determine for himself the validity of conclusions."

Report can be in writing or oral. Reports are usually in writing. This is because, they acts as a reference for future. Oral reports are justified, especially when the matter is of urgent nature or where secrecy needs to be maintained.

4.4.2 Structure of a scientific report must contain

- **Title:** Make your title specific enough to describe the contents of the paper, the title usually describes the subject matter of the article, sometimes a title that summarizes the results is more effective.

- **Authors**: The person who did the work and wrote the paper is generally listed as the first author of a research paper.

- **Abstract**: An abstract, or summary, is published together with a research article, giving the reader a "preview" of what's to come. Such abstracts may also be published separately in bibliographical sources. They allow other scientists to quickly scan the large scientific literature, and decide which articles they want to read in depth. The abstract should be a little less technical than the article itself.

- **Introduction:** What question did you ask in your experiment? Why is it interesting? The introduction summarizes the relevant literature so that the reader will understand why you were interested in the question you asked.

- **Materials and methods:** There should be enough information here to allow another scientist to repeat your experiment., it may helpful to include a diagram, table or flowchart to explain the methods you used, include preliminary results that were used to design the main experiment that you are reporting on.

- **Results:** Researcher presents the outcome. Use graphs and tables if appropriate, but also summarize main findings in the text.

- **Tables and Graphs:** Tables should be used with proper title and graphs should indicate X and Y axis. If you can summarize the information in one sentence, then a table or graph is not necessary.
- **Discussion:** Highlight the most significant results, but don't just repeat.
- **Acknowledgement:** This section is optional. Researcher can thank those who either helped with the experiments, or made other important contributions.
- **References:** In the References section list citations in alphabetical order.

4.5 TYPE OF REPORT

There are various types of research report. The types of research report are as follows.

- **Technical Report:** This is a comprehensive report of a technical research. It is primarily meant for academic of professional community such as scientists, engineers, doctors, research scholars, etc.

▪ This report covers all aspects of research such as:

a. Statements of research problem.

b. Time frame of the research.

c. Area of research.

d. Resources used for conducting research.

e. Techniques of data collection and analysis, etc.

▪ This report consists of several parts or elements such as:

a. Introduction to the research problem.

b. Methodology used to conduct research.

c. Findings of research.

d. Limitations of research, if any.

e. Conclusions and Recommendations, etc.

The technical report is written in technical language. It follows a specified pattern and consists of several sections with proper headings and paragraphs.

- **Popular Report:** It is designed for executives and other non- technical users. The reader is more interested in knowing:

a. Findings of the research.

b. Conclusions.

c. Recommendations.

- While writing this report, certain essentials must be followed:

a. Concise and clarity

b. Accuracy of data

c. Reliability of data

d. Objectivity and not biased.

e. Logical arrangement of different parts of report, etc.

- This type of report is meant for commercial and social research because it is meant for non-technical people, especially executives in a commercial organization.

- **Interim Report:** When there is long time gap between data collection and presentation of final report, the study may lose its importance. Therefore, the sponsor may also lose interest in the research and /or research report. Therefore in such situation, the researcher may present interim report. The interim report may contain the first analysis of the problem and the final analysis of certain aspects that have been completely analyzed. This type of report enables the sponsoring authority to take decisions without waiting for the full report.

- **Summary Report:** It is generally prepared for the use of general public. This report is desirable for any study whose findings are of general interest. It is written in non-technical and simple language. It contains a brief reference to the objectives of the research, findings and conclusions. It is a short report of two or three pages. For instance, a study may be conducted to find out the impact of globalization on employment. The study may be based on professionals and executives. The study may indicate that professionals and executives work for longer hours in a week- 60 to 70 hours – to meet deadlines. This results in burnout which causes stress related problems.

- **Research Abstract:** This is a summary of technical report. Technical students like engineering, medicine, etc., usually prepare it on the eve of submitting their thesis. Its copies are sent to the university, which in turn provides a gist to the examiners or referees invited to evaluate the thesis.

- The research abstract contains:

a. Statement of the research problem

b. Objective of the study

c. Methodology used

d. Overview of the research

e. Summary of the results of the study.

- The research abstract enables the examiner or referee to conduct viva-voce and award the M .Phil/ PhD degree.

- **Research Article:** This is designed for publication in a professional journal. If a study has two or more important aspects that can be discussed independently, it is advisable to write two articles rather than to include in a single article.

- A research articles must be clearly written in concise and clear language. It must be logically arranged as follows:

a. Statement of the research problem

b. Objectives of research

c. Methodology used to conduct research

d. Findings

e. Conclusion

f. Recommendations.

4.6 DIFFERENT STEPS IN PREPARATION OF RESEARCH REPORT

The report must be effectively drafted. The researcher must follow the general guidelines for drafting a good report. The following are the steps in writing a research report:

- **Planning for Writing Research Report:** The researcher must plan for writing the research report. Planning involves the following aspects.

a. Length or number of pages of the report.

b. Format of drafting the report

c. Drafting style, preferably impersonal style.

d. Objectives of Research report.

e. Language of the research report.

f. Quality of paper used for report.

g. Colours – Only black / White, or coloured printing.

- **Definition of Target Audience:** The researcher must define the target readers. Target readers can be:

a. In the case of academic research – the guide and the referee, and also general readers.

b. In commercial research – top management.

c. In social research – sponsoring authority and the general public.

- The researcher should understand the nature of target readers, whether they understand the technical language, whether they have enough time to go through a detailed report, etc.

- **Proper Format:** The report must be written in a suitable format. The report must be divided into paragraphs, preferably numbered and be given a suitable heading for each paragraph. The report must also contain a suitable title.

- **Local Arrangement:** The report must be written in a systematic manner. The ideas or views or findings must be arranged in a logical sequence to ensure coherence. Related paragraphs or ideas must be written in successive paragraphs. The different parts of the report must be arranged in the following order. First the title of the report, followed by a brief introduction, then the procedure adopted in collecting data, then the findings and recommendations and finally the data and signature of the reporter of chairman of the reporting committee.

- **Proper Drafting:** The report must be drafted in an impersonal style. The report should be written in third person such as **"The committee recommends."** However, certain reports can be written in the first person, such as **"I recommend…"**

- **Approval:** Incase of academic research, the report may require approval from the guide. If required, the guide may ask for changes or modifications. Therefore, it is always better to show a rough draft to the guide rather than the final draft. This can save a lot of time, money and effort with special reference to printing and binding. In the case of social research, the report needs to be approved by the sponsoring authority, and in the case of commercial research, the report needs to be approved by the top management.

- **Redrafting:** The researcher may redraft the report as per the directions of the guide in the case of academic research. In case of commercial and social research, the researcher on his own may make correction, wherever required or on the basis of advice give by some experts.

- **Printing and Binding:** The report must be properly printed and bound. Wherever required, charts, tables must be shown in different formats as colours. The research report must be of appropriate size or length. Normally, the research report is printed on A-4 size paper.

- **Submission of Report:** The report must be submitted within a certain deadline. For instance, certain reports must be submitted within a particular time limit, especially in the case of commercial research activity. If the research reports are delayed, then the management may not be able to take the right decisions, and the situation may become worse than before.

- The research report must be submitted to the appropriate authority:

a. Commercial research – to the top management.

b. Academic research – to the university/ referee.

c. Social research – to the sponsoring authority.

- **Feedback:** The researcher must obtain feedback to find out whether the report is accepted or not. If accepted then he must know whether the decisions have solved the problem or generated benefits. Proper feedback is vital so as to ensure proper research activity in future.

4.7 LAYOUT /STRUCTURE OF RESEARCH REPORT

- The report must contain proper structure or outline. The structure indicates the various parts of research report. The various parts of research report are as follows:

- **Title of the Report:** The research report must clearly state the title of research project. For example, in the case of commercial research undertaken to study the causes of decline in sales of a particular brand in 2014, then the title will be: **"Research Report on Decline in Sales of Brand AAA in 2016".**

- The title page must also include:

a. The person or the agency, on behalf of whom the research is conducted.

b. The person or the agency that conducted the research project.

c. Submission date of the research report.

- **Letter of Authorization**: The research report must contain the letter of authorization. This letter indicates the official or the authority that has authorized or sponsored the research work. Letter of authorization gives authenticity to the research report.

- **Letter of Transmittal**: The research report may also contain Letter of Transmittal. It indicates the name of the person or the authority to whom the report is transmitted or addressed.

- **Table of Contents (Index)**: Research report must contain table of contents for the benefit of the reader. The table of contents should indicate:

a. Main parts or sections of the report.

b. Chapters heading with page numbers.

c. Statistical tables, charts, etc., with the page numbers.

- **Introduction**: The introduction part gives the genesis of the report. It indicates:

a. Statement of the research problem.

b. Objectives of research.

c. Formulation of hypothesis, if any.

d. Scope of the study.

e. Brief review of previous studies on the same problem/topic.

- **Methodology :** The report should describe the methodology used in conducting the research:

a. If the data is collected from only secondary sources, reason must be given for the same.

b. If the data is collected only from primary sources, then the reason must be given.

c. If a sample survey is conducted, then the details of sampling must be given with respect to universe, elements, sample size, sampling method.

- **Findings:** This is an important element of research report. Normally, the findings constitute the large section of the report. The researcher should provide findings in logical sequence**.** At times, the researcher must provide major findings, and the minor findings may be deleted, because it may confuse the reader. The tables, charts or pictures relating to the findings may be given near the matter.

- **Limitations:** The report may contain limitations of the research work. For instance, there may be limitation relating to time, money, or the problem of getting information on certain aspects may be due to lack of cooperation on the part of the respondents, or the problem of sampling. The limitation will help the reader to frame his own opinion regarding the reliability of the report. The limitations are also useful to other researchers who may research on similar topics.

- **Conclusions:** The research report may contain a summary the report and conclusions. The conclusions are drawn for the findings. The conclusions must give references to the pages tables or paragraphs of the findings on the basis of which they are drawn.

- **Recommendations:** The report may contain recommendations, especially in the case of commercial or social research. The

recommendations must be very clear and supported by footnotes, if any. Footnotes are generally used as reference guide or short explanation to certain complicated terms/ matter.

- **Appendix:** The research report must contain appendix. It consists of addition to the report. It provides supplementary information and supports findings. The appendix includes copies of:

a. Questionnaire used to collect data.

b. Large and complex statistical tables.

c. Glossary/key terms.

d. Any other additional matter.

- **Bibliography:** In case of academic and social research bibliography is a must. It indicates:

a. Titles of the books/articles/magazines/reports referred for the research work.

b. Name of the authors/publishers.

c. Year of publication.

d. Page number of the matter used in the research work.

e. The bibliography must be arranged in an alphabetical order.

- **Signature and Date:** The researcher report must be signed by the concerned person. For instance, a research report prepared by a committee, the report needs to be signed by the chairman of the committee and by members. In case an academic research report, the report needs to be signed by the person who has conducted the research as well as that of the guide. The research must be dated. The date is very important, especially if the reports are submitted to legal authorities.

4.8 LANGUAGE OF RESEARCH REPORT

Different types of writing require different levels of formality. A report is generally an analysis, evaluation or description based on research. Reports are generally written in a formal style. Scientific papers should be written with correct grammar, spelling and punctuation.

4.9 ILLUSTRATION AND TABLES IN RESEARCH REPORT

Tables, figures and illustrations must be identified with the word "Table", "Figure", or other appropriate descriptor, and include a title and/or caption. Must use a consistent format for titles and captions of tables, figures and illustrations throughout the thesis.

4.10 BIBLIOGRAPHY

List of works cited should begin at the end of the paper on a new page with the centered title, References. Alphabetize the entries in your list by the author's last name, using the letter-by-letter system (ignore spaces and other punctuation.) Only the initials of the first and middle names are given. If the author's name is unknown, alphabetize by the title, ignoring any A, An, or The.

4.11 REFERENCES AND FOOTNOTES

Footnotes or endnotes acknowledge which parts of their paper reference particular sources. Generally, you want to provide the author's name, publication title, publication information, date of publication, and page number(s) if it is the first time the source is being used.

4.12 PLAGIARISM

Plagiarism is considered as the most unacceptable behaviour in the field of research. Plagiarism is the appropriation of another's work, ideas, methods, results or words without having official permission or approval. Here acknowledgement of the source and original author is found absent. In recent years the prevalence of plagiarism has been increasing. The rich information that could be accessed at our fingertips through the internet facility may be considered as one of the finer reasons behind this. When the researchers are in the rat race to increase the number of publications as a credit of their own, this easy access has made the copy and paste Research technique to become more widely used. As a result many ideas, words and works of others mingle easily into one's own research work.

There are various types of plagiarism. The most well known and the most common type of plagiarism is "copying" If someone copies some ones work and puts it in his/her name that means it is plagiarism. There is another concept known as "Patch work Plagiarism" this occurs when only some phrases from the original source are out and puts in his/her name. the third type is "Paraphrasing plagiarism" here another's work is summarized without citing the source in this type the words are changed a little but the authors thoughts are retained. The fourth type of plagiarism is called "Unintentional plagiarism" it occurs when the writer incorrectly quotes or incorrectly cites a source.

Avoiding plagiarism is very simple we need to be honest and give credit to others. We should always acknowledge the author of the original work one should use own work as far as possible.

4.13 SUMMARY

At last we have come to the end of this unit and let's recapitulate briefly what has been discussed. We know that report is a self-explanatory statement of facts. It is a summary of findings and recommendations about a particular problem and provides information for decision making and

follow up actions. On the other hand a scientific Research report is the presentation of the research and its results in a rigorously formatted document that follows a conventional structure. Research reports contain a standard set of elements that include front matter, body, and end matter. The structure of a scientific report must contain a title to describe the contents of the paper. It must include the Authors also. The structure of a scientific report must have an abstract, or summary, so that other scientists may quickly scan the large scientific literature, and decide which articles they want to read in depth. Introduction, materials and methods used, results, tables and graphs are also included in the structure of a scientific report. The discussion part in the structure of these reports highlights the most significant results. Acknowledgement section is optional. In the references section list comes in alphabetical order. There are various types of research report such as Technical Report, Popular Report, Interim Report, Summary Report, Research Abstract and Research Article. While writing a Research Report different steps are followed in its preparation and the report must be effectively drafted following the general guidelines. The researcher must plan for writing the research report and define the target readers. It must be written in a suitable format, in a systematic manner with an impersonal style of drafting. Sometimes, especially in case of academic research, the report may require approval from the guide. Hence to save time, energy and money it is suggested always to show a rough draft to the guide rather than the final draft. Regarding submission of report it may be said that it should be properly printed and bound with appropriate size or length and must be submitted within a given deadline. Feedback is important for a researcher to find out whether the report is accepted or not. As far as the language of research report is concerned we can say that scientific papers should be written with correct grammar, spelling and punctuation. A report must have a consistent format for titles and captions of tables, figures and illustrations throughout the thesis. Last but not the least a report must have Bibliography, References and Footnotes. To conclude it may be said that knowledge of the rules and principles involved in writing a research report will help the researcher to write better thesis.

4.14 CHECK YOUR PROGRESS/ EXERCISE

1. True False

a. Reports are usually presented in writing because they act as a reference for future.

b. References section allows other scientists to quickly scan the large scientific literature, and decide which articles they want to read in depth.

c. In the case of academic research target readers can be top management.

d. The research report can be of any size or length according to the researcher's wish.

e. The limitation of a report will help the reader as well as other researchers who want to research on similar topics to frame his own opinion regarding the reliability of the report.

2. Fill in the blanks

a. The person who did the work and wrote the paper is generally listed as the first _____ of a research paper.

b. _____ Report designed for executives and other non-technical users.

c. Summary Report generally prepared for the use of _____ _____.

d. The report must be divided into paragraphs, preferably _____ and be given a suitable _____ for each paragraph.

e. The report must be submitted within a certain _____.

3. Multiple choice question

a. Planning for writing Research Report involves the following aspects

i. Objectives of research, methodology used to conduct research, findings.

ii. Length or number of pages of the report, format of drafting the report, drafting style, preferably impersonal style, objectives of Research report etc.

iii. Objectives of research, Formulation of hypothesis, if any, Scope of the study etc.

b. Bibliography indicates:

i. Titles of the books/articles/magazines/reports referred for the research work, Name of the authors/publishers, Year of publication, Page number of the matter used in the research work.

ii. Questionnaire used to collect data, Large and complex statistical tables, Glossary/key terms, any other additional matter.

iii. Objectives of Research report, Language of the research report, Quality of paper used for report.

c. Oral reports are justified :

i. especially when the matter acts as a reference for future.

ii. especially when the matter in the scientific paper does not have a self-explanatory title.

iii. especially when the matter is of urgent nature or where secrecy needs to be maintained.

d. The technical report is written in technical language and covers all aspects of research such as:

i. preliminary results, accuracy of data, reliability of data.

ii. statements of research problem, time frame of the research and area of research.

iii. short report of two or three pages.

e. The research abstract enables the examiner or referee to conduct viva- voce and award the

i. M .Phil/ PhD degree.

ii. M.A./M.Sc. degree

iii. B.A./B.Sc. degree

4. Answers the following Questions

1. Define Research Report. Describe the structure of Scientific Report.
2. Name the various types of research report? Elaborate any three of them.
3. State the different steps in preparation of Research Report.
4. What does a structure of a Scientific Report indicate? What are the various parts of research report?
5. What do you understand by Language of Research Report?
6. Write short notes on:

a. Illustration and Tables in Research Report

b. Bibliography

c. References and Footnotes

d. Appendix

e. Methodology

f. Limitations

g. Interim Report

h. Research Abstract

i. Target Audience

j. Proper Format

4.15 ANSWERS TO THE SELF LEARNING QUESTIONS

1.a. true

1.b. false, Abstracts allow other scientists to quickly scan the large scientific literature, and decide which articles they want to read in depth

1.c. false, In the case of academic research target readers can be the guide and the referee, and also general readers.

1.d. false, The research report must be of appropriate size or length.

1.e.true

2.a. author

2.b. popular

2.c. general public.

2.d. numbered, heading

2.e. deadline

3.a.ii

3.b.i

3.c.iii.

3.d.ii.

3.e.i.

4.16 TECHNICAL WORDS

Abstract- a summary of the contents of a book, article, or speech

Bibliography- is a list of works, such as books and articles, written on a particular subject or by a particular author.

Research-careful or diligent search and organized study or gathering of information about a specific topic

Report- an oral or written account of something that one has observed or investigated

Structure- gives a pattern

4.17 TASK

1. In a chart draw a column and compare between any two types of scientific reports.
2. In a chart write down the Layout /Structure Of Research Report using bullets and colours.

4.18 REFERENCES FOR FURTHER STUDY

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8. “An Introduction to the Finite Element Method” by J. N. Reddy
9. How to Lie with Statistics, by Darrell Huff, Published September 1st 1982 by W. W. Norton & Company
10. The Visual Display of Quantitative Information, by Edward R. Tufte, Published January 1st 2001 by Graphics Press
11. Data Just Right: Introduction to Large-Scale Data & Analytics by Michael Manoochehri
12. Marketing Analytics: Data-Driven Techniques with Microsoft Excel by Wayne Winston

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5

PREPARATION RESEARCH REPORT

Unit Structure :

5.0 After going through this chapter you will be able to understand the following features:

5.1 Introduction

5.2 Report Format

5.1 INTRODUCTION

A research report is a document prepared on the basis of statistical and observational analysis by an analyst or a researcher. In other words it can be said that Research report is a written document containing key aspects of research project.

Mostly, research work is presented in a written form. The practical utility of research study depends heavily on the way it is presented to those who are expected to apply the findings of the research in the relevant cases.

Research report is a medium to communicate research work with relevant people. It is also a good source of preservation of research work for the future reference. Many times, research findings are not followed because of improper presentation. Preparation of research report is not an easy task. It is an art. It requires a good deal of knowledge, imagination, experience, and expertise. It demands a considerable time and money.

5.2 REPORT FORMAT

There is no predefined format for research reports. The format depends on several relevant variables. Therefore, one must employ a suitable format to create a desirable impression with clarity. Report must be attractive. It should be written systematically and bound carefully. A report must use the format (often called structure) that best fit the needs and wants of its readers. Normally, following format is suggested as a basic outline, which has sufficient flexibility to meet most of the situations:

A research report is divided into three parts:

I. First Part (Formality Part):

- **Cover page**: this includes the educational, professional and research related details of the researcher/s
- **Title page**: this gives the title and a subtitle. The title must be written in the centre of the page in bold.
- **Certificate or statement:** this includes a certificate in the form of a statement issued by the author or the researcher which mentions that

the work presented in the present report is original and is not presented anywhere else. It may include the certificate of compliance or approval of the project issued by the concerned authority.

- **Index (brief contents):** this is a record of the contents of the project in short- only titles
- **Table of contents (detailed index):** this is a detailed index which clearly states the location of each component like the tables, figures, maps, photographs, etc.
- **Acknowledgement:** this is a note to thank all the people, organizations, bodies, etc. who has helped the researcher to complete his work and compile the report.
- **Preface/forwarding/introduction:** this includes a brief introduction about the research work presented in the report. It introduces the topic with reference to the targeted readers and sets a start for the readers.
- **Summary report:** it is the short form of the long research report. It gives an introduction to all the components of the report.

II. Main Report (Central Part of Report):

- **Statement of objectives:** it describes the objectives of the research in detail. This helps the researcher to follow the research without deviating from the goal. It also helps the readers to understand the flow of research designed by the researcher.
- **Review of Literature:** this is the study of the topic undertaken from the already existing literature published or undertaken by other researchers, writers, journalists, etc.
- **Area of Study:** this give detailed information about the geographical area covered by the researcher for the present work.
- **Methodology and research design:** it is a systematic step by step procedure of conducting the research. It includes the following points:
  - **Types of data and its sources:** this is the detailed information about the types of data used for the research. It further gives a detailed account of the sources of each data used by the researcher.
  - **Sampling decisions:** this includes a brief description of the sampling technique used while collecting primary data.
  - **Data collection methods:** the data can be collected through several ways from primary as well as secondary sources. This describes all the methods employed by the researcher in detail.
  - **Data collection tools:** this describes the mediums used for collecting each type of data.
  - **Fieldwork:** this gives a detailed account of the field work including the dates, days, time and location chosen by the researcher.
- **Analysis and interpretation:** analysis is the statistical output of the data collected by the researcher. Interpretation is the understanding of

the analysis which the researcher writes on the basis of his personal knowledge, literature review and observations during survey

- **Findings:** these are the major statistical and observational facts drawn out of the research.
- **Limitations:** every work is incomplete as it has certain limitations like insufficient sample, lack of time, small size of the area and so on. It is the researcher's ethical duty to enlist the possible limitations so that the readers understand that the researcher realizes the reality and that there is a further scope to expand the work.
- **Conclusions and recommendations:** this is the main part of the research report as it helps to understand the level of fulfilment of the set objectives. It includes suggestions which may be practically applicable so that an improvement may be brought in the study area.

III. Appendix (Additional Details):

- Tables not included in findings
- A copy of the questionnaire
- Bibliography – list of books, magazines, journals, and other reports

QUESTION PAPER PATTERN

	Paper–IX:RESEARCH METHODOLOGY IN GEOGRAPHY	
Q.1	Unit–I	18
Q.2	Unit–II	18
Q.3	Unit–III	18
Q.4	Unit–IV	18
Q.5	Unit–V(Research Report)	18
Q.7	JournalandViva	10