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RESEARCH METHODOLOGY

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UNIT-I

INTRODUCTION:

In the modern complex world every society today is faced with serious social, economic and political problems. These problems need systematic intelligent and practical solution. Problem solving is a technical process. It requires among all other things accumulation of new knowledge. Research provides the means for accumulating such a fund of knowledge and wisdom. In other words research is a systematic effort at gathering analysis and interpretation of the problems confronted by humanity. It is a thinking process and a scientific method of studying a problem and finding solution.

Research is not the exclusive preserve of a chosen few. Any individual belonging to any field of activity can undertake research or activities to repeat a search. Research or activities to repeat a search . Research or activities to repeat a search. Research helps to push the frontiers of knowledge beyond the horizon. It is an indepth analysis based on reflective thinking of the various phenomena or observed units to make a generalization. Research is essential for building up of the knowledge base in social science. It develops concepts theories and tools of measurement. It also provides the research investigator necessary skills to analyze problems scientifically and find solutions.

WHAT IS RESEARCH? OR DEFINE THE WORD RESEARCH.

The word “research” is derived from the French word “researcher” meaning “to search back”. A man in his social, economic, educational, political and business life faces many problems.

Research is the process of moving from “unknown” to “known”. Research is the process gaining new knowledge.

In broader sense, Research is a serious academic activity with a set of objectives to explain or analysis or understands a problem or finding solution for problem adopting a systematic approach in collecting, organizing and analyzing the information relating to a problem.

DEFINITION: Fred Kerlinger : “Research is an organized enquiry designed and carried out to provide information for solving a problem”.

Francis Rummel: “Research is a careful enquiry or examination to discover new information or relationship and expand and to verify existing knowledge”.

Robert Ross: “Research is essentially an investigation, a recording and analysis of evidence for the purpose gaining knowledge”.

WHAT IS BUSINESS RESEARCH? (OR) MEANING OF BUSINESS RESEARCH.

An increasing amount of attention is being devoted to the making process of business managers, customers, and employees. Many of the advances in business management in recent years are the result of adopting research findings in the behavioral sciences to business situations.

It is important to beat in mind that all the social science law and many other disciplines may have aspects that relate to business.

Research in all aspects of business is becoming increasingly important in the major countries of the world. It is a method of obtaining and evaluating data for the decision process. Business research is both basic and applied.

STATE THE OBJECTIVES OF RESEARCH

- (a) To gain familiarity with a concept or to achieve new insight into it.
- (b) To reveal accurately the characteristics of a particular individual, situation, event or group.

- (c) To determine the frequency with which something occurs or with which it is associated with something else.
- (D) to test a hypothesis of casual relationship between variables.

WHAT ARE THE MOTIVES THAT INDUCES A RESEARCHER TO UNDERTAKE RESEARCH WORK? Motives In Research:

- (a) To get a research degree along with its benefits.
- (b) To face the challenge in solving unsolved problems.
- (c) To get intellectual joy of doing some creative work.
- (D) To serve the society. ,To get respectability.

EXPLAIN THE SIGNIFICANCE OR IMPORTANCE OF RESEARCH

“All progress is born of enquiries. Doubt is often better than overconfidence. Doubt leads to enquiry and enquiry leads to invention” is a famous maxim in context of which the significance of research can be understood

1. The role of research in several fields of economics, whether related to business or to the economy as a whole, has greatly increased in modern times.
2. Research provides the basis for nearly all government policies in our economic system.
3. Research has its special significance in solving various operational and planning problems of business and industry.
4. It is equally important for social scientists in studying answers to various social problems
5. In addition to what has been stated above, the significance of research can also be studied keeping in view of the following points:
6. To those students who are to write a master’s degree or PhD thesis, research may mean careerism or a way to attain high position in the social structure.
 - (a) To someone, it may mean the development of new style and creative work.
 - (b) To analysts and intellectuals, it may mean the generalizations of new theories.

EXPLAIN THE PROCESS OF RESEARCH:

Research process consists of series of actions or steps necessary to effectively carry out research and the desired sequencing of these steps.

Formulating the research problem:

At the very outset the researcher must single out the problem he wants to study, i.e., he must decide the general area of interest or aspect of a subject-matter that he would like to inquire into. There are two significant steps are involved in formulating the research problem, viz., understanding the problem thoroughly, and rephrasing the same into meaningful terms from an analytical point of view.

Extensive literature survey:

Once the problem formulated, a brief summary of it should be written down. It is a compulsory for a research worker writing a thesis for a PhD. degree to write a synopsis of the topic and submit it to the necessary Committee or the Research Board for approval. At this juncture the researcher should undertake extensive survey connected with the problem.

Development of working hypotheses:

Researcher should state in clear terms the working hypothesis or hypotheses, after extensive literature survey is over. Working hypothesis is tentative assumption made in order to draw out and test its logical or empirical consequences. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research.

Preparing the research design:

The research problem having been formulated in clear cut terms, the researcher will be required to prepare a research design. i.e., he will have to state the conceptual structure within which

research would be conducted. The preparation of such a design facilitates research to be as efficient as possible in yielding maximal information. In other words, the function of research design is to provide for the collection of relevant evidence with expenditure of effort, time and money.

Determining sample design:

All the items under consideration in any field of inquiry constitute of a ‘Universe’ or ‘Population’. A complete list of all the items in the population is known as a census inquiry. Even the slightest element of bias in such as inquiry will get larger and larger as the number of observations increase.

The researcher must decide the way of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population.

Data collection:

In dealing with any real data at hand are inadequate, and hence, it becomes necessary to collect data that are appropriate. These are several ways of collecting the appropriate data which differ considerably in context of money costs, time and other resources at the disposal of the researcher. The researcher can use any one of the following methods of data collection

1. By observation,
2. Through personal interview,
3. Through telephone interview,
4. By mailing of questionnaire,
5. Through schedules.

Analysis of data:

The researcher turns to the task of analyzing data after they have been collected. The analysis of data required a number of closely related operations such as establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences.

Hypothesis testing:

After analyzing the data, the researcher is in a position to test the hypotheses, if any, he had defined before. Do the facts support the hypotheses or they happen to be contrary? This is usual question which should be answered while testing hypotheses. The researcher can use the suitable test for testing of the defined hypothesis. The use of tests depends upon the nature and object of research inquiry. Hypothesis will result in either accepting the hypothesis or in rejecting it.

Generalizations and interpretation:

If a hypothesis is tested and upheld several times, it may be possible for the researcher to arrive at generation, i.e., to build a theory. If the researcher had no hypothesis to start with, he might seek to explain his findings on the basis of some theory. It is known as interpretation.

Preparation of the report and the thesis:

Finally, the researcher has to prepare the report of what has been done by him. Writing of report must be done with great care keeping in view the following:

- a. Preliminary pages ,
- b. Main text,
- c. The end matter.

FEATURES OR NATURE OF RESEARCH

- (a) **Controlled:** there are many factors that influence an outcome. In a study of cause and effect relations, it is important to be able to link the effect with the cause and vice versa.
- (b) **Rigorous:** The researcher must confirm that the procedures followed to find answers to questions are relevant, appropriate and justified.
- (c) **Systematic:** this implies that the procedures followed to undertake an investigation follow certain logical sequence.
- (d) **Valid and verifiable:** this implies that the conclusions and findings of a research should be valid and verified by others.

(E) Empirical: This means that conclusions drawn are based on evidence gathered from information collected from real life experience or observation.

CLASSIFICATION OR KINDS OF RESEARCH:

Action Research:

The process by which researchers attempts to study their problems scientifically in order to guide, correct and evaluate their decisions and an action is called action research. The following example will clearly explain how action research is conducted. A teacher finds out that most of his students are weak in mathematics. This poses a problem to him. He finds out the probable cause for it. As a result of it, he can improve the understanding capacity of the students.

Applied Research:

The applied research may be conducted with a view to test the basic assumptions of a theory or validity of a theory. In short, applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organization. It is undertaken with the aim of uncovering data to solve an existing problem. The driving force of this research is finding solution to a problem. Applied research aims at application of science to a singular situation.

Comparative Research:

This research aims at comparing institutions, practices, concepts and the like over a period of time. For example, a study of the financial performance of two banks in terms of profitability over a period of time is comparative study.

Descriptive Research:

Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. In social science and business research, we quite often use the term Ex Facto research for descriptive research studies.

Exploratory Research:

When the purpose of research is to gain familiarity with a phenomenon or acquire new insights into it in order to formulate a more precise problem or to develop hypothesis, the exploratory studies come in handy. If the theory happens to be too general or too specific, a hypothesis cannot be formulated. Therefore a need for an exploratory research is felt to gain experience that will be helpful in formulating relevant hypothesis for more definite investigation.

The following are the three approaches to the exploratory study,

- a) The survey of literature
- b) The experience survey
- c) Case study

Historical Research:

Historical research is the induction of principles through research to the past and social forces which have shaped the present. Its aim is to apply reflective thinking to unsolved social problem by discovering past trends of events, facts and attributes, and by tracing lines of development in human thought and action.

Individual and Group Research:

The research undertaken by an individual is called individual research. It is done on the basis of one's own interest and capacity. Group research is undertaken by several researchers. Research in colleges and universities financed by grants is done on a group basis.

Library Research:

It is conducted with the help of written materials mostly located in large libraries. This research is concerned with the evolution of theories, study involving cause and effect relationship and seeking out significant facts and interpretation of the past data which are found in journal and reports.

Model Building Research:

This type of research is mostly done in the field of management. The basic management science represents many theories, which are mostly complex. In the area of business, sales forecasting models, advertising models, inventory control models, production control models and capital investment models can be constructed.

Operation Research:

This method of research has been done for solving problems by using scientific methods and quantitative techniques. The industrial operations researcher is interested in the application of methods to solve the pressing or critical problems of their firm.

Pure, Basic or Fundamental Research:

Pure research is being undertaken to satisfy the researcher's thirst for knowledge and it is mainly goaded by the researcher's curiosity. It may be undertaken for designing tools to tackle practical problems. It is concerned with particular situation and not suitable to a wide area. Pure research provides the basis for applied research. Thus, pure research enables us to make tools and applied research uses such tools to study a particular case.

Social Research: It includes social sciences, humanities and languages. It incorporates man and his institutions. It is largely empirical and it does not believe in arm-chair research.

Empirical Study:

Empirical research relies on experience or observation alone for system and theory. The other name of empirical research is experimental research. The three main features of experimental techniques, viz., Isolation of factors, replication of the experiment and quantitative measurement of results appear to be applicable and relevant at least in some social sciences and in some fields.

Analytical Research: If the researcher has to use the facts or information already available and analyze these to make a critical evaluation of the material is known as analytical research.

Quantitative Research: It is based on the measurement of quantity or amount. It is applicable variable that can be expressed in terms of quantity.

Qualitative Research: It is concerned qualitative fact. That is fact relating to quality.

Case Study:

In the words of Pauline V.Young, "A comprehensive study of a social unit – be that unit a person, a group, a social institution, a district, or a community is called a case study". The case study is an intensive study through which one can know precisely the factors and causes of a particular phenomenon. It is a very good method for collecting information about a social unit.

Other Types:

- a) One time research or longitudinal research
- b) Field setting research or laboratory research.
- c) Clinical diagnostic research.

Experimental Research – Definition

Experimental research is any research conducted with a scientific approach, where a set of variables are kept constant while the other set of variables are being measured as the subject of experiment.

The simplest example of an experimental research is conducting a laboratory test. As long as research is being conducted under scientifically acceptable conditions – it qualifies as an experimental research. A true experimental research is considered to be successful only when the researcher confirms that a change in the dependent variable is solely due to the manipulation of the independent variable.

It is important for an experimental research to establish cause and effect of a phenomenon, which means, it should be definite that effects observed from an experiment are due to the cause. As naturally, occurring event can be confusing for researchers to establish conclusions. For instance, if a cardiology student conducts research to understand the effect of food on cholesterol and derives that most heart patients are non-vegetarians or have diabetes. They are aspects (causes) which can result in a heart attack (effect).

Experimental research is conducted in the following situations:

- Time is a vital factor for establishing a relationship between cause and effect.
- Invariable behavior between cause and effect.

- The eminence of cause-effect relationship is as per desirability.

Types of Experimental Research Design

There are three primary types of experimental research design:

- Pre-experimental research design
- True experimental research design
- Quasi-experimental research design

The different types of experimental research design are based on the how the researcher classifies the subjects according to various conditions and groups.

1.Pre-Experimental Research Design: This is the simplest form of experimental research design. A group, or various groups, are kept under observation after factors are considered for cause and effect. It is usually conducted to understand whether further investigation needs to be carried out on the target group/s, due to which it is considered to be cost-effective.

The pre-experimental research design is further bifurcated into three types:

1. One-shot Case Study Research Design
2. One-group Pretest-posttest Research Design
3. Static-group Comparison

2. True Experimental Research Design: True experimental research is the most accurate form of experimental research design as it relies on statistical analysis to prove or disprove a hypothesis. It is the only type of Experimental Design that can establish a cause-effect relationship within a group/s. In a true experiment, there are three factors which need to be satisfied:

1. Control Group (Group of participants for research that are familiar to the Experimental group but experimental research rules do not apply to them.) and Experimental Group (Research participants on whom experimental research rules do apply.)
2. Variable which can be manipulated by the researcher
3. Random distribution

This experimental research method is commonly implemented in physical sciences.

3. Quasi-Experimental Research Design: The word “Quasi” indicates resemblance. A quasi-experimental research design is similar to experimental research but is not exactly that. The difference between the two the assignment of a control group. In this research design, an independent variable is manipulated but the participants of a group are not randomly assigned as per conditions. The independent variable is manipulated before calculating the dependent variable and so, directionality problem is eliminated. Quasi-research is used in field settings where random assignment is either irrelevant or not required.

Advantages of Experimental Research

- Researchers have a stronger hold over variables to obtain desired results.
- Subject or industry is not a criterion for experimental research due to which any industry can implement it for research purposes.
- Results are extremely specific.
- Once the results are analyzed, they can be applied to various other similar aspects.
- Cause and effect of a hypothesis can be derived so that researchers can analyze greater details.

- Experimental research can be used in association with other research methods.

Survey Research Definition

Survey Research is defined as the process of conducting research using surveys that are sent to survey respondents. The data collected from surveys is then statistically analyzed to draw meaningful research conclusions.

In the 21st century, every organization's eager to understand what their customers think about their products or services and make better business decisions. Research can be conducted in multiple ways but surveys are proven to be one of the most effective and trustworthy research methods. An online survey is classified as a method for extracting information about a significant business matter from an individual or a group of individuals and consists of structured survey questions that motivate the participants to respond.

Generally, it's the primary step towards obtaining quick information about mainstream topics and conducting more rigorous and detailed quantitative research methods like surveys/polls or qualitative research methods like focus groups/on-call interviews can follow. There are many situations where this research can be conducted using a blend of both, qualitative and quantitative strategies.

Survey Research Methods

Survey research methods can be derived on the basis of two critical factors: Survey research tool and time involved for conducting research.

There are three main survey research methods, divided based on the medium of conducting survey research:

- **Online/ Email-**Online survey research is one of the most popular survey research methods in this day and age. The cost involved in online survey research is extremely minimal and the responses gathered are highly accurate but the only drawback of this survey research method is that the response rates are lower compared to the other mediums.
- **Phone-**Survey research conducted over phone can be useful in collecting data from a larger section of the target population but there are chances that the money invested in phone surveys will be higher than other mediums and also that the time required will be higher.
- **Face-to-face-** In situations where there is a complicated problem to solve, face-to-face survey research can be conducted. The response rate of this method is the highest but it can be extremely expensive.

Further, on the basis of the time taken, survey research can be classified into two methods:

- **Longitudinal Survey Research:** Longitudinal survey research involves conducting survey research over a continuum of time, which may be spread across years and decades. The data collected using this survey research method from one time period to another, is qualitative or quantitative in nature. Respondent behavior, preferences, attitudes are observed constantly over time to analyze reasons for change in behavior or preferences. For example, if a researcher intends to learn about eating habits of teenagers, he/she will follow a sample of teenagers over a considerable period of time to ensure that the collected information is reliable.
- Longitudinal survey research is often followed by cross-sectional survey research.

- **Cross-sectional Survey Research:** Cross-sectional survey research is conducted to collect insights from a target audience at a particular time interval. This survey research method is implemented in various sectors such as retail, education, healthcare, SME businesses etc. Cross-sectional survey research can either be descriptive or analytical in nature. This survey research method is quick and helps researchers collected information in a brief time span. Researchers rely on cross-sectional survey research method in situations where descriptive analysis of a subject is required.
- Learn more: [Cross-sectional Survey Research vs Longitudinal Survey Research](#)
- Survey research also be bifurcated according to the sampling methods used to form samples for research: Probability and Non-probability sampling. Every individual of a population should be considered equally to be a part of the survey research sample. Probability sampling is a sampling method in which the elements are chosen on the basis of a probability theory. There are various probability research methods such as simple random sampling, systematic sampling, cluster sampling, stratified random sampling etc. Non-probability sampling is a sampling method where the researcher's knowledge and experience is considered to form samples. The various non-probability sampling techniques are convenience sampling, snowball sampling, consecutive sampling, judgemental sampling and quota sampling.

Process of implementing survey research methods:

1. **Decide survey questions:** Brainstorm and put together effective survey questions which are grammatically and logically appropriate. This can be done by understanding the objective and expected outcomes of the survey. There are many surveys where details of responses are not as important as gaining insights about what customers prefer from the provided options.
2. In such situations, a researcher can include multiple choice questions or closed-ended questions. Whereas, if details about certain questions are to be obtained, researchers can include open-ended questions.
3. Ideally, the surveys should include a clever balance of open-ended and closed-ended questions. Use survey questions like Likert Scale, Semantic Scale, Net Promoter Score question etc. to avoid fence-sitting.
4. **Finalize a target audience:** Send out relevant surveys as per the target audience and filter out irrelevant questions as per the requirement. The survey research will be extremely effective in case a sample is decided from the target population. This way, results can be according to the desired market and be generalized to the entire population.
5. **Send out surveys via decided mediums:** Distribute the surveys to the target audience and patiently wait for the feedback and comments- this is the most important step of the survey research. The survey needs to be scheduled keeping in mind the nature of the target audience and the regions they belong to.
6. Surveys can be conducted via email, embedded in website, shared via social media etc. to gain maximum responses.
7. **Analyze survey results:** Analyze the feedback in real-time and identify patterns in the responses which might lead to a much-needed breakthrough for your organization. GAP, TURF, Conjoint analysis, Cross tabulation and many such survey feedback analysis methods can be used to spot and shed light on respondent behavior. The results can be then used to implement corrective measures to improve customer/employee satisfaction.

Reasons to Conduct Survey Research

The most crucial and integral reason for conducting market research using surveys is that you can collect answers regarding definite, significant questions. These questions can be asked in multiple formats as per the target audience and the intent of the survey. Before designing a survey, every organization must figure out the objective of carrying this out so that the survey can be structured, planned and executed to perfection.

Questions that need to be on your mind while designing a survey are:

- The primary aim of conducting the survey.
- How do you plan to utilize the collected survey data.
- The type of decisions you plan to take on the basis of the above-mentioned points.

There are 3 very important reasons why an organization must conduct survey research.

1. **Understand respondent behavior to get solutions to your queries:** If you've carefully curated a survey, the respondents will provide insights about what they like about your organization as well as suggestions for improvement. To motivate them to respond, you must be very vocal about how secure their responses will be as well as how will you utilize the answers. This will push them to be 100% honest about their feedback, opinions, and comments. Online surveys or mobile surveys have proved their privacy and due to this more and more respondents feel free to put forth their feedback through these mediums.
2. **Present a medium for discussion:** A survey can be the perfect platform for respondents to provide criticism or applause for an organization. Important topics like product quality or quality of customer service etc. can be put on the table for discussion. A way you can do it is by including open-ended questions where the respondents can write their thoughts. This will make it easy for you to get correlate your survey to what you intend to do with your product or service.
3. **Strategy for never-ending improvements:** An organization can establish the attributes of the target audience from the pilot phase of a survey research. The criticism and feedback received from this survey can be put to make improvements in the product/services. Once the improvements are successfully made, another survey can be sent out to measure the change in feedback keeping the pilot phase as the benchmark. By doing this activity, the organization can keep track of what was effectively improved and what still needs improvement.

Advantages & Disadvantages of Case Study Method of Data Collection

Advantages of Case Study Method of Data Collection

Following are the advantage of case study Method

1. **Intensive Study.** Case study method is responsible for intensive study of a unit. It is the investigation and exploration of an event thoroughly and deeply.
2. **No Sampling.** It studies a social unit in its entire perspectives. It means there is no sampling in case study method.

3. **Continuous Analysis.** It is valuable in analyzing continuously the life of a social unit to dig out the facts.
4. **Hypothesis Formulation.** This method is useful for formulation of hypothesis for further study.
5. **Comparisons.** It compares different type of facts about the study of a unity.
6. **Increase in Knowledge.** It gives the analytical power of a person to increase knowledge about a social phenomena.
7. **Generalization of Data.** Case study method provides grounds for generalization of data for illustrating statistical findings.
8. **Comprehensive.** It is a comprehensive method of data collection in social research.
9. **Locate Deviant Cases.** The deviant cases are these units which behave against the proposed hypothesis. So, it locate these deviant cases. The tendency is to ignore them but are important for scientific study.
10. **Farming Questionnaire or Schedule.** Through case study method we can formulate and develop a questionnaire and schedule.

Disadvantage of Case Study Method of Data Collection

Case study method has the following disadvantages

1. **Limited Representatives.** Due to as narrow focuses a case study has limited representatives and generalization is impossible.
2. **No Classification.** Any classification is not possible due to studying a small unit.
3. **Possibility of Errors.** Case study method may have the errors of memory and judgment.
4. **Subjective Method.** It is a subjective method rather than objective.
5. **No Easy and Simple.** This method is very difficult and no layman can conduct this method.
6. **Bias Can Occur.** Due to narrow study the discrimination & bias can occurs in the investigation of a social unit.
7. **No Fixed Limits.** This method is depend on situation and have no fixed limits of investigation of the researcher.
8. **Costly and Time Consuming.** This method is more costly and time consuming as compare to other methods of data collection.

UNIT II

RESEARCH DESIGN:

MEANING:

A research design is a logical and systematic planning and it helps in directing a piece of research. In short, it is the blue print of the proposed study. Decisions regarding what, where, when, how much, by what means concerning an enquiry constitute a research design.

COMPONENTS OF RESEARCH DESIGN

Title of the study:

In order to identify the proposed study, sufficient information should be given in the title. While selecting a title, the researcher should deem the following points;

- a) The title should be specific
- b) The title should indicate the topic of the study
- c) The title language should be professional in nature but not pedantic.

Introduction: The researcher is asked to give a brief explanation about the study in general.

Statement of the problem: The researcher should state the problem after the introduction stage is over. While stating the problem, use of clear, simple and concise statement is preferable.

Review of literature:

A review of previous literature enables the researcher to know about different areas covered by various studies, to focus on the areas where little research has been carried out, to look into various merits and pitfalls of certain studies already finished and to verify the present findings with that of the previous ones.

Scope of the study:

It is depends on several factors such as time and money available with the investigator, availability of the sample, and co-operation of the sample force and so on.

Objectives of the study:

The objectives enlighten the researcher's own mind and lead to more efficient enquiry. Once the objectives are framed, the study can be undertaken with required accuracy and within the given resources. The objectives framed should be well within the scope of the study.

Formulation and testing of Hypothesis: Hypotheses are formulated to explain observed facts, conditions, or behaviors and to serve as a guide in the research process. To determine whether hypothesis is valid or not, each hypothesis is individually tested. It should be stated in clear, concise and understandable language.

Operational definition of concepts:

All terms, which are not clear in meaning, used in the study should be clarified. It is very important to understand the terms used in the study clearly. It is necessary to identify and label the variables. The variables can be labeled as independent variable and dependent variable.

Geographical area to be covered: In this head, the researcher mentioned the area to be covered in his study.

Period of the study: The period of reference can be mentioned under this heading.

Methodology:

The researcher should know the kind of information needed to answer the research questions, know the sources of data and finally he must know the techniques which are to be applied for analyzing and interpreting the data.

Sampling:

Sampling involves taking a portion of population, making observation on this smaller group and then generalizing the findings to be applied to a large population. If the sample is biased, the findings of the study cannot be generalized.

Tools for collection of data:

According to subject matter, the unit of enquiry and the scale of study, the choice of method for collecting the data are determined. Observational techniques are used on a study of the behaviour of a group of people. A questionnaire is adequate for a simple enquiry among cross section of population. A survey of general population entailing many complicated questions would call for personal interviewing.

NEED FOR RESEARCH DESIGN:

- (a) It is needed because it facilitates the smooth sailing of the various research operations.
- (b) Just like a blueprint, the researcher is in need of research design to know the types of data and its sources.
- (c) It is required to identify the basic objectives of the research.
- (d) It helps the researcher to find out flaws or discrepancies of his study.
- (e) It can be referred by guide or some other experts, so that mistakes can be corrected.
- (f) It helps to define the problem which is to be solved

ESSENTIALS OF RESEARCH DESIGN

A good research design should be of definite help in achieving optimum objectivity, reliability, validity and generalization:

1.Objectivity:

When a phenomenon is observed in its true form without being affected by observer's own views it may be termed as objective observation. For example when we say that milk is white, it is an objective statement. But if we say that milk is most useful drink, the statement may not be purely objective. Thus the research design must be objective or definite in nature.

2. Reliability:

It refers to consistency throughout a series of measurements. The investigator should frame his items in such a way that the respondent cannot give only one genuine response. i.e. if a respondent gives a response to an item, he should give the same response to the related items. In the same manner, a good research must be a reliable one which should not lead to confusion.

3. Validity: A good research design must be a valid one in the sense, the correctness of a research design must be subject to verification.

4. Generalization:

Most research is concerned not only with the effect of one variable upon another under the particular setting studied, but also with its effect in a natural setting and on a larger population.

Other criteria:

- (a) It must be free from bias
- (b) It must be flexible in nature
- (c) It should describe the situation.
- (d) It should involve testing of hypothesis.

Types of research design:

The problems of conducting theoretically informed concrete research can be illuminated further by considering alternative research designs. Sellitz and others have suggested four broad categories of research designs namely

- (a) exploratory or formulate study
- (b) descriptive study
- (c) diagnostic study
- (d) experimental study

RESEARCH PROBLEM

Research problem is a definite or clear expression [statement] about an area of concern, a condition to be improved upon, a difficulty to be eliminated, or a troubling question that exists in scholarly literature, in theory, or within existing practice that points to a need for meaningful understanding and deliberate investigation. A research problem does not state how to do something, offer a vague or broad proposition, or present a value question.

Follow These 5 Steps To Formulate Your Research Problem

1. SPECIFY THE RESEARCH OBJECTIVES

A clear statement defining your objectives will help you develop effective research.

It will help the decision makers evaluate the research questions your project should answer as well as the research methods your project will use to answer those questions. It's critical that you have manageable objectives. (Two or three clear goals will help to keep your research project focused and relevant.)

2. REVIEW THE ENVIRONMENT OR CONTEXT OF THE RESEARCH PROBLEM

As a marketing researcher, you must work closely with your team of researchers in defining and testing environmental variables. This will help you determine whether the findings of your project will produce enough information to be worth the cost.

In order to do this, you have to identify the environmental variables that will affect the research project and begin formulating different methods to control these variables.

3. EXPLORE THE NATURE OF THE PROBLEM

Research problems range from simple to complex, depending on the number of variables and the nature of their relationship. Sometimes the relationship between two variables is directly related to a problem or questions, and other times the relationship is entirely unimportant.

If you understand the nature of the research *problem as a researcher*, you will be able to better develop a solution to the problem.

To help you understand all dimensions, you might want to consider focus groups of consumers, salespeople, managers, or professionals to provide what is sometimes much-needed insight into a particular set of questions or problems.

4. DEFINE THE VARIABLE RELATIONSHIPS

Marketing plans often focus on creating a sequence of behaviors that occur over time, as in the adoption of a new package design, or the introduction of a new product.

Such programs create a commitment to follow some behavioral pattern or method in the future.

Studying such a process involves:

- Determining which variables affect the solution to the research problem.
- Determining the degree to which each variable can be controlled and used for the purposes of the company.
- Determining the functional relationships between the variables and which variables are critical to the solution of the research problem.

During the **problem formulation** stage, you will want to generate and consider as many courses of action and variable relationships as possible.

5. THE CONSEQUENCES OF ALTERNATIVE COURSES OF ACTION

There are always consequences to any course of action used in one or more projects. Anticipating and communicating the possible outcomes of various courses of action is a primary responsibility in the [research process](#).

Hypothesis Formulation in Research

When research is conducted hypothesis formulation is one of the most preliminary steps. Hypothesis formulation helps in formulating the research problem. Hypothesis formulation is not a necessary but an important step of the research. A valid and reasonable research can be conducted without any hypothesis. Hypothesis can be one and it can be as many as possible. Some studies are conducted to develop a hypothesis, like exploratory studies, so exploratory studies do not have a clear hypothesis. Descriptive studies can also be conducted without a hypothesis. In explanatory studies, that develop a relationship between dependent and independent variable, as well as, explain the type of relationship between the two variables, there is always a hypothesis.

Definition of Hypothesis

A hypothesis is a possible answer to a research question. It is a presumption or a hunch on the basis of which a study has to be conducted. This hypothesis is tested for possible rejection or approval. If the hypothesis get accepted it shows that your hunch was right if it get rejected it still does not mean that your research was not valid, but it means that it is the opposite way you thought and perceived. Whether it is approved or not it gives you some conclusion and adds to the available body of knowledge.

A hypothesis which has been tested again and again by various researchers can still be tested for making it more valid but if the hypothesis has been approved in such a manner that it has become a law that it is better to test something that adds to the available knowledge rather than approving something which has been approved many times before.

Example:

For example if you want to conduct a study on the Effects of Parental Depression on the Academic Performance of Children, you may like to conduct it without any hypothesis but then you will have many dimensions to think upon and will be more likely get distracted. If you formulate a hypothesis, that parental depression results in depression in children too and this depression leads to low grades, your research will get a direction and you will not think about the broader effects of depression everything is well defined you have to test the impact of depression on the children's depression and as well as on the grades of children. You may not need to test the impacts on the extracurricular activities, class conduct, and other such things.

Characteristics of a Well-formulated Research Hypothesis:

1. **Testable and Verifiable:** A research hypothesis has to be checked for possible approval or rejection. This analysis is done statistically and, therefore it should be such that can be tested

and analyzed. After analysis, the results can be obtained. Some hypothesis can not be tested because they are too subjective and they are not suitable for research. Research needs objectivity and evidences without these two things any research is impossible to conduct. For example you may want to conduct a research on the existence of God but to prove the existence of God is a far different phenomenon and even you may formulate a hypothesis is but you can not test it statistically, therefore, such hypothesis and research questions should be avoided.

2. **Simple and Clear:** The wording of the hypothesis should have to be simple and clear. Any complex ideas and wordings should be avoided. A simple hypothesis will make it easier for you to carry on throughout the research and will be easy to read and understand. In addition to the terminology and phrasing, the hypothesis should have to be clear in your mind from every perspective. If there are any ambiguities or questions in your mind, resolve them at this stage; if they are not clear you will find it hard to conduct the study in later stages.
3. **Relevant:** The hypothesis should have to be relevant to the study that you are about to conduct. An irrelevant hypothesis will lead to an invalid research. Hypothesis is the possible answer to your research question if your presumption or your presumed answer is wrong and irrelevant your method to find its accuracy too will not result in any relevant conclusions. Check whether your hypothesis is related to the direction in which you have planned to take your research or not.
4. **Importance of Research Hypothesis:**
For a new researcher, it is important to have a research hypothesis so as to be directional. Research hypothesis can be present in research and it may not be but if it is present it can have following benefits.
5. **Clarity:** Hypothesis brings clarity to research. It makes your mind clear about the way in which you have to carry on the research. Methodology of the research depends greatly on the research hypothesis. Clarity brings 50 % chances of success in research. At each step, you need to be clear about every aspect and dimension. If you are not clear about a single thing you should not go forward, stay where ever you are and resolve the issue and then move to the next step.
6. **Focus:** You formulate your research hypothesis and you get a focal point in your research. You need not go off the track and stay intact to the main objective which you set for the hypothesis. Your research becomes organized and haphazard actions are minimized.
7. **Direction:** Hypothesis sets a direction of research. This direction shows you what should be the objectives, methodology, mode of analysis and research design. With a hypothesis, you have a confidence that whatever you have presumed will be tested rather than testing something that is irrelevant to the research.
8. **Objectivity:** Every research requires objectivity but without hypothesis you may collect data which is not relevant to the research and hence decreases the objectivity of the research. When you know that your hypothesis only deals with a particular aspect of the phenomenon you will not collect data that is not required and the objectivity and validity of the research increases.
9. **Add to the Body of Knowledge:** A hypothesis adds to the available body of knowledge. For example you study different literature and you find out that this much work has already been done on this topic and you should concentrate on the gaps that are yet to be filled by new research you formulate a hypothesis and keep your direction towards it.

Types of Hypothesis

First, we must take a moment to define **independent** and **dependent** variables. Simply put, an independent variable is the cause and the dependent variable is the effect. The independent variable can be changed whereas the dependent variable is what you're watching for change. For example: How does the amount of makeup one applies affect how clear their skin is? Here, the independent variable is the makeup and the dependent variable is the skin.

The six most common forms of hypotheses are:

- Simple Hypothesis
- Complex Hypothesis
- Empirical Hypothesis
- Null Hypothesis (Denoted by "H₀")
- Alternative Hypothesis (Denoted by "H₁")
- Logical Hypothesis
- Statistical Hypothesis

A **simple hypothesis** is a prediction of the relationship between two variables: the independent variable and the dependent variable.

- Drinking sugary drinks daily leads to obesity.

A **complex hypothesis** examines the relationship between two or more independent variables and two or more dependent variables.

- Overweight adults who 1) value longevity and 2) seek happiness are more likely than other adults to 1) lose their excess weight and 2) feel a more regular sense of joy.

A **null hypothesis** (H₀) exists when a researcher believes there is no relationship between the two variables, or there is a lack of information to state a scientific hypothesis. This is something to attempt to disprove or discredit.

- There is no significant change in my health during the times when I drink green tea only or root beer only.

This is where the **alternative hypothesis** (H₁) enters the scene. In an attempt to disprove a null hypothesis, researchers will seek to discover an alternative hypothesis.

- My health improves during the times when I drink green tea only, as opposed to root beer only.

A **logical hypothesis** is a proposed explanation possessing limited evidence. Generally, you want to turn a logical hypothesis into an empirical hypothesis, putting your theories or postulations to the test.

- Cacti experience more successful growth rates than tulips on Mars. (Until we're able to test plant growth in Mars' ground for an extended period of time, the evidence for this claim will be limited and the hypothesis will only remain logical.)

An **empirical hypothesis**, or working hypothesis, comes to life when a theory is being put to the test, using observation and experiment. It's no longer just an idea or notion. It's actually going through some trial and error, and perhaps changing around those independent variables.

- Roses watered with liquid Vitamin B grow faster than roses watered with liquid Vitamin E. (Here, trial and error is leading to a series of findings.)

A **statistical hypothesis** is an examination of a portion of a population.

- If you wanted to conduct a study on the life expectancy of Savannians, you would want to examine every single resident of Savannah. This is not practical. Therefore, you would conduct your research using a statistical hypothesis, or a sample of the Savannian population.

Types of Experimental Research

The following module discusses the types of experimental research and focuses on the types of research designs commonly used in true experimental research.

Learning Objectives:

- List the three broad categories of experimental research.
- Describe the different kinds of true experimental research design.
- Discuss the importance of randomization of subjects and describe how subjects are assigned to groups.

There are three basic types of experimental research designs . These include pre-experimental designs, true experimental designs, and quasi-experimental designs. The degree to which the researcher assigns subjects to conditions and groups distinguishes the type of experimental design. This module will focus on the different types of **true experimental designs**. True experimental designs are **characterized by the random selection of participants and the random assignment of the participants** to groups in the study. The researcher also has **complete control over the extraneous variables**. Therefore, it can be confidently determined that that effect on the dependent variable is directly due to the manipulation of the independent variable. For these reasons, true experimental designs are often considered the best type of research design. There are several types of true experimental designs and they are as follows:

- **Post-test Only Design** – This type of design has two randomly assigned groups: an experimental group and a control group. Neither group is pretested before the implementation of the treatment. The treatment is applied to the experimental group and the post-test is carried out on both groups to assess the effect of the treatment or manipulation. This type of design is common when it is not possible to pretest the subjects.
- **Pretest-Post-test Only Design** - The subjects are again randomly assigned to either the experimental or the control group. Both groups are pretested for the independent variable. The experimental group receives the treatment and both groups are post-tested to examine the effects of manipulating the independent variable on the dependent variable.
- **Solomon Four Group Design** – Subjects are randomly assigned into one of four groups. There are two experimental groups and two control groups. Only two groups are pretested. One pretested group and one unprotected group receive the treatment. All four groups will receive the post-test. The effects of the dependent variable originally observed are then compared to the effects of the independent variable on the dependent variable as seen in the post-test results. This method is really a combination of the previous two methods and is used to eliminate potential sources of error.
- **Factorial Design** – The researcher manipulates two or more independent variables (factors) simultaneously to observe their effects on the dependent variable. This design allows for the testing of two or more hypotheses in a single project. One example would be a researcher who wanted to test two different protocols for burn wounds with the frequency of the care being administered in 2, 4, and 6 hour increments.
- **Randomized Block Design** – This design is used when there are inherent differences between subjects and possible differences in experimental conditions. If there are a large number of experimental groups, the randomized block design may be used to bring some homogeneity to each group. For example, if a researcher wanted to examine the effects of three different kinds of cough medications on children ages 2-16, the research may want to create age groups (blocks) for the children, realizing that the effects of the medication may depend on age. This is a simple method for reducing the variability among treatment groups.
- **Crossover Design (also known as Repeat Measures Design)** – Subjects in this design are exposed to more than one treatment and the subjects are randomly assigned to different orders of the treatment. The groups compared have an equal distribution of characteristics and there is a high level of similarity among subjects that are exposed to different conditions. Crossover designs are excellent research tools, however, there is some concern that the response to the second treatment or condition will be influenced by their experience with the first treatment. In this type of design, the subjects serve as their own control groups.

Once the design has been determined, there are four elements of true experimental research that must be considered:

- **Manipulation:** The researcher will purposefully change or manipulate the independent variable, which is the treatment or condition that will be applied to the experimental groups. It is important to establish clear procedural guidelines for application of the treatment to promote consistency and ensure that the manipulation itself does affect the dependent variable.

- **Control:** Control is used to prevent the influence of outside factors (extraneous variables) from influencing the outcome of the study. This ensures that outcome is caused by the manipulation of the independent variable. Therefore, a critical piece of experimental design is keeping all other potential variables constant. For example, if testing the effects of fertilizer on plant height, all other factors such as sunlight, soil type and water would have to be constant (controlled).
- **Random Assignment:** A key feature of true experimental design is the random assignment of subjects into groups. Participants should have an equal chance of being assigned into any group in the experiment. This further ensures that the outcome of the study is due to the manipulation of the independent variable and is not influenced by the composition of the test groups. Subjects can be randomly assigned in many ways, some of which are relatively easy, including flipping a coin, drawing names, using a random table, or utilizing a computer assisted random sequencing.
- **Random selection:** In addition to randomly assigning the test subjects in groups, it is also important to randomly select the test subjects from a larger target audience. For example, if a researcher wanted to look at the impact of sleep on the test scores of 5th graders in a particular city, a sample of 5th graders would need to be randomly selected from the city's population in such a way that any 5th grader would have an equal chance of being selected for the study. This ensures that the sample population provides an accurate cross-sectional representation of the larger population including different socioeconomic backgrounds, races, intelligence levels, and so forth.

UNIT III

Research Process

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. ... The scientific **research process** is a multiple-step **process** where the steps are interlinked with the other steps in the **process**.

Dissertation markers expect the explanation of research process to be included in Methodology chapter. A typical research process comprises the following stages:

1. Selecting the research area. You are expected to state that you have selected the research area due to professional and personal interests in the area and this statement must be true. The importance of this first stage in the research process is often underestimated by many students. If you find research area and research problem that is genuinely interesting to you it is for sure that the whole process of writing your dissertation will be much easier. Therefore, it is never too early to start thinking about the research area for your dissertation.

2. Formulating research aim, objectives and research questions or developing hypotheses. The choice between the formulation of research questions and the development of hypotheses depends on your research approach as it is discussed further below in more details. Appropriate research aims and objectives or hypotheses usually result from several attempts and revisions and these need to be mentioned in Methodology chapter. It is critically important to get your research questions or hypotheses confirmed by your supervisor before moving forward with the work.

3. Conducting the literature review. Literature review is usually the longest stage in the research process. Actually, the literature review starts even before the formulation of research aims and objective; because you have to check if exactly the same research problem has been addressed before.

Nevertheless, the main part of the literature review is conducted after the formulation of research aim and objectives. You have to use a wide range of secondary data sources such as books, newspapers, magazines, journals, online articles etc.

4. Selecting methods of data collection. Data collection method(s) need to be selected on the basis of critically analyzing advantages and disadvantages associated with several alternative data collection methods. In studies involving primary data collection, in-depth discussions of advantages and disadvantages of selected primary data collection method(s) need to be included in methodology.

5. Collecting the primary data. Primary data collection needs to be preceded by a great level of preparation and pilot data collection may be required in case of questionnaires. Primary data collection is not a compulsory stage for all dissertations and you will skip this stage if you are conducting a desk-based research.

6. Data analysis. Analysis of data plays an important role in the achievement of research aim and objectives. Data analysis methods vary between secondary and primary studies, as well as, between qualitative and quantitative studies.

7. Reaching conclusions. Conclusions relate to the level of achievement of research aims and objectives. In this final part of your dissertation you will have to justify why you think that research aims and objectives have been achieved. Conclusions also need to cover research limitations and suggestions for future research.

8. Completing the research. Following all of the stages described above, and organizing separate chapters into one file leads to the completion of the first draft. The first draft of your dissertation needs to be prepared at least one month before the submission deadline. This is because you will need to have sufficient amount of time to address feedback of your supervisor.

COLLECTION OF DATA INTRODUCTION:

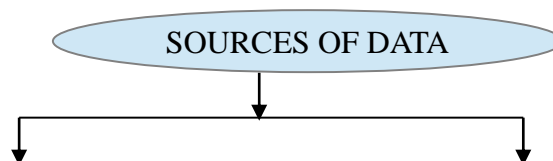
There are several ways of collecting data which differ considerably in context of money costs, time and the other resources at the disposal of the researcher. Primary data can be collected either through experiment or through survey. If the researcher conducts an experiment, he observes some quantitative measurements, or a data, with help of which he examines the truth contained in his hypothesis. In case of survey, data can be collected by any one or more of the following ways.

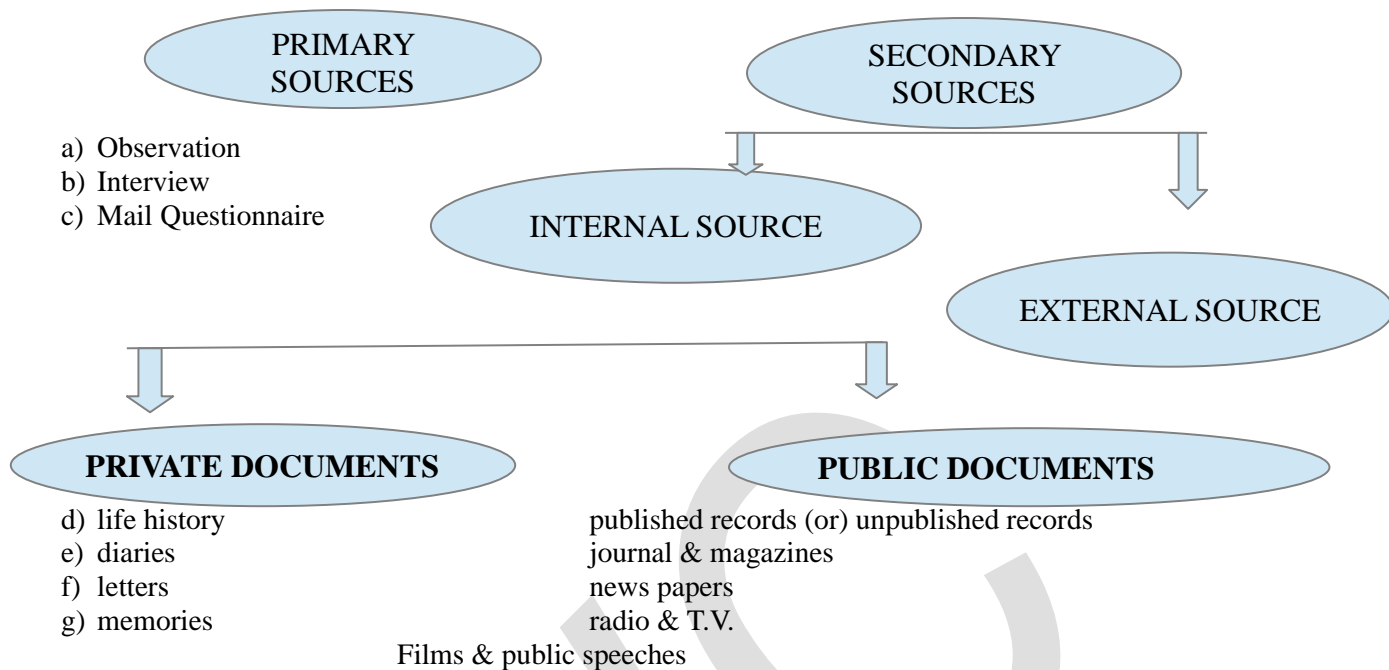
1. By observation,
2. Through personal interview,
3. Through telephone interviews,
4. By mailing of questionnaires,
5. Through schedules

METHODS OF DATA COLLECTION:

The basic problem of statistical enquiry is to collect facts and figures relating to a particular phenomenon under study, whether the enquiry is in business, economic or social science. The investigator is the person who conducts the statistical enquiry. He is a trained and efficient statistician. He counts or measures the characteristics under study for further statistical analysis. The respondents (informants) are the persons from whom the information is collected. The statistical units are the items on which the measurement is taken.

Collection of data is the process of enumeration together with the proper recording of results. The success of an enquiry is based upon the proper collection of data. Collection of data is the first step in any statistical investigation. Data are generally classified into two groups.





Internal data:

Internal data come from internal sources related with the functioning of an organization or firm where records regarding purchase, production, sales, profit etc., are kept on regular basis. Various Government departments like Railways, Communications, Education etc., also generate internal data which are useful for their proper internal functioning.

External data:

The external data are collected and published by external agencies. This type of data can be obtained from primary source of secondary source. Thus the external data can further be classified as 1. Primary data 2. Secondary data.

WRITE A NOTE ON PRIMARY AND SECONDARY DATA.

PRIMARY DATA:

The sources of information that a researcher should tap way with his interest and type of study he has undertaken. The sources of information are divided in to two such as field and documentary sources. The data from field sources may be collected from persons who have a fund of knowledge about social conditions by following observation, interview, questionnaire and other devices. Primary data are those, which are collected for the first time, and they are original in character. The data which are collected directly from the field of enquiry for specific purpose is called primary data. The collection of primary data may be made through either by complete enumeration or sampling survey methods.

Considerable amounts of data are available in the published and unpublished documents, reports, manuscript, letters, and diaries and so on. Data obtained from published and unpublished records of governmental or public bodies are called secondary data. The secondary data may be collected from primary sources, secondary sources and tertiary sources of information.

Primary sources of information include firsthand accounts of experimentation and investigation (articles in professional journals, doctoral thesis, monographs and questionnaires), original works (letters, diaries, autobiographies) and reports (proceedings of state legislature and parliament, court annual reports and minutes)

SECONDARY DATA:

Secondary sources of information are summaries of information gathered from primary sources. These include translations, summaries and reviews of research (encyclopedia, articles) abstracts guide books and other publications containing factual information, commentaries and so on. Tertiary sources of information include text books. Secondary data are those, which are already collected by some one for some purpose and are available for the present study.

1.Bibliographies, 2.Indexes, 3.Abstracts, 4.Statistical, 5.Sources, 6.Directories, 7.Year books,

8. Encyclopedias.

STATE VARIOUS METHODS OR TOOLS OF COLLECTION OF DATA.

1. Questionnaire, 2. Personal interview, 3. Observation, 4. Schedule

WHAT IS QUESTIONNAIRE? WHAT ARE ITS TYPES?

Questionnaire is a statement of questions which are to be answered by the respondents. Questionnaire is used primarily in making status studies of current practices and in conducting opinion polls and surveying attitudes. Questionnaire is a schedule to be filled up by an informant rather than by the researcher. The researcher must construct his questionnaire so as to elicit reliable and authentic information. The informant is a competent source of data. The respondent must have the ability to understand the questions asked.

The researcher should decide what facts and opinions are to be solicited. He should also determine the persons to whom the questionnaire is to be sent. Every questionnaire should contain either in its body or in a covering letter

- 1) A descriptive title for the study
- 2) Purpose of the study
- 3) Name of sponsoring agency or institution
- 4) Name and address of the persons to whom the completed questionnaire is to be returned
- 5) How to fill up and the questionnaire should include a guarantee that the identity of the respondent will not be revealed.

Types of questionnaire:

There are two types of questions. They are supply type and selective type. The supply type of question allows the respondent to write how he feels about a topic. Such questions require a high standard of literacy. These questions demand still greater amount of energy, willingness and care on the part of the respondent. As a consequence, unless the sample is carefully chosen and restricted to literate groups, the answers to such free questions are likely to be incomplete. The selection type of questions may be yes-No or true /false or right/wrong or multiple choice, the respondent checks the suggested answer had applied to him.

EXPLAIN THE GUIDELINES FOR CONSTRUCTING A QUESTIONNAIRE.

The following rules should be followed in the construction of questionnaire

- (e) Express the items as clearly as possible
- (f) Choose words that have precise meanings wherever possible
- (g) Avoid complex or awkward word arrangement
- (h) Include all qualifications needed to provide a reasonable basis for response selection.
- (i) Avoid unessential specificity in the question or in the response
- (j) Avoid the inclusion of non functional words in the item.
- (k) Make the suggested answers as simple as possible.
- (l) Avoid inclusion of trivial questions
- (m) Be sure that the items will seem to the respondent to apply to the situation
- (n) Refrain from asking questions of opinion, unless opinion is specifically required
- (o) Avoid items that are too suggestive or too stimulating. They should not lead a respondent to beyond the facts, but they should induce him to provide the required information.

WHAT IS INTERVIEW? EXPLAIN ITS TYPES.

It is a meeting in which the interviewer puts questions to the interviewee and records his responses. The meeting is always face to face where both the parties communicate with each other not only through words (verbal interaction) but also through gestures, mannerisms, facial expressions, etc. (visual interaction). All interviews are pseudo-conversational in nature. This means that they are with a purpose where the interviewer's aim is to elicit as much relevant information as is possible within a specified time.

Type of interview:

Structured interview:

In structured interview a detailed schedule is used. A list of predetermined questions is used and takes the form of a questionnaire. It is predetermined questions that are used and takes the form of a

questionnaire. It is highly useful for administrative and market research of various types .

Non structured interview:

The non structured interviews are free flowing interviews. No list of predetermined questions was used. The researcher uses an inter-guide. He encourages the interviewee to have free expression by such comments as it so “Go ahead”, etc.

Focused interview:

Focused interview is focused on the reaction, attitude and emotional response of persons on a particular situation under study such as film seen by him and radio programme heard by him.

Depth interview:

The depth interview aims at eliciting deeper feelings, emotions or convictions. It calls for specialized training on the part of the researcher. When skillfully and cautiously used by an interviewer having specialized training, the depth interview can reveal important aspects of psycho-social situations which are otherwise not readily available and yet may be crucial for understanding observed behavior and reported opinions and attitudes.

Panel interview:

The panel interview aims at the investigator to call on a respondent periodically and collect the data for the periods between two consecutive visits.

WHAT ARE THE ADVANTAGES AND DISADVANTAGES OF INTERVIEW?

Advantages:

- (e) The interview can be used with illiterate respondents
- (f) Proportion of the respondents participating in an interview is generally more than proportion of respondents who return a mail questionnaire.
- (g) The information secured through an interview is likely to be more correct than that secured by a mail questionnaire. This is because interviewer can point out the inconsistencies in replies on the spot and correct them. In case of deliberate lies he can probe deeper to find out the truth and can observe and record details of interviewee’s behaviour (nervousness, hesitations, etc) in responding .he can also clarify certain questions which the interviewee does not fully understand.
- (h) Discussion on sensitive and emotional subjects can be better approached by an unstructured interview than by any other technique.
- (i) In an interview the respondent is generally caught off guard which enables the interviewer to observe his spontaneous reaction (facial expressions, gestures, etc.) to the questions put to him and advantage not available in the case of mail questionnaires.

Disadvantages of interview techniques:

- 7. The interview is generally more costly than other techniques
- 8. The organization required for selecting, training and supervising a field staff is more complex than that need in other techniques. The training of interviewers is often a long and costly process. The more on directive the interview, the greater the need for highly killed interviewers
- 9. The interviewer may suffer from bias, faulty perception, faulty memory, lack of insight and inability to articulate. He put words in the mouth of respondent or changes the whole context of a question.
- 10. The interviewer may (because of fatigue, decreased task interest, etc.)Alter the manner in which questions are put to interviewee or the sincerity with which responses are recorded from one interview to the next, etc. As a consequence, the validity and reliability of obtained data may suffer.
- 11. The characteristics of the interviewer, the interviewee (Ex: sex, race, socio economic status, etc.) and their combination may influence the measured variables.

EXPLAIN VARIOUS METHODS ADOPTED FOR COLLECTING PRIMARY DATA

(f) PERSONAL INTERVIEW:

Under this method of collecting data, the investigator should contact the persons from whom the information’s obtained. The investigator must be tactful and courteous in behavior. He asks the questions the informant and collects necessary information.

Merits:

1. Original (first hand information) data are collected.
2. True and reliable data can be had
3. The investigator can extract correct information.
4. A high degree of accuracy can be aimed.
5. Uniformity and homogeneity can be maintained.

Demerits:

1. It is unsuitable where the area is large.
2. It is expensive
3. The chances of bias are more
4. An untrained investigator will not bring good result.

(g) Indirect oral investigation:

This is a method of collecting primary data through indirect sources. Under this method the investigator approaches the witness on third parties, who are in touch with the informant. The investigator interviews the people, who are directly or indirectly connected with the problem under study. This method is usually adopted by enquiry committees or commissions appointed by the government, private bodies etc.

Merits:

1. It is simple and convenient.
2. It saves time, money and labour
3. The information is unbiased
4. Adequate information can be had
5. It can be used in the investigation of a large area.

Demerits:

1. Absence of direct contact is there, the information cannot be relied.
2. Interview with an improper man will spoil the result.
3. In order to get the real position, a sufficient number of persons are to be interviewed.
4. The careless attitude of the informant will affect the degree of accuracy.

(h) Information from correspondents:

The correspondents gather information on the subject of enquiry and pass on the same to the investigator. This method is adopted by newspaper and journals etc, when information is needed in different fields for ex, accidents, share markets, politics, strikes etc.,. The informants are generally called correspondents.

Merits:

1. Extensive information can be had
2. It is the most cheap and economical method
3. Speedy information is possible.
4. It is useful where information is needed regularly.

Demerits:

1. The information may be biased.
2. Degree of accuracy cannot be maintained.
3. Uniformity cannot be maintained.
4. Data may not be original.

(i) Mailed questionnaire method:

In this method, a questionnaire consisting of a list of questions pertaining to the enquiry is prepared. There are blank spaces for answers. This questionnaire is sent to the respondents, who are expected to write the answers in the blank spaces. A covering letter is also sent along with the questionnaire. To get quick and better response, the return postage expense is borne by the investigator.

Merits:

1. Of all the methods, the mailed questionnaire method is the most economical
2. It can be widely used, when the area of investigation is large.
3. It saves money, labour, and time.
4. Error in the investigation is very small, because information is obtained directly from the respondents.

Demerits:

1. In this method, there is no direct contact between the investigator and the respondent.
2. This method is suitable only for literate people.
3. There is long delay in receiving questionnaires duly filled in.
4. People may not give the correct answer and thus one is led to false conclusion.

(j) Schedules sent through enumerators:

It is the most widely used method of collection of primary data. A number of enumerators are selected and trained. They are provided with Standardized questionnaires. Each enumerator will be in charge of a certain area. The investigator goes to the informants along with the questionnaire and gets replies to the questions in the schedule and records their answers. He explains clearly the object and the purpose of the enquiry. Population census is conducted by this method.

Merits:

1. This method is very useful in extensive enquiries
2. It yields reliable and accurate results.
3. The scope of the enquiry can also be greatly enlarged.
4. Even if the respondents are illiterate, this technique can be widely used.

Demerits:

1. This is a very costly method, as the enumerators are trained and paid for.
2. This method is time-consuming, because the enumerators go personally to obtain the Information
3. Personal bias of the enumerators may lead to false conclusion.
4. It is not suited to all persons due to its costliness.

EXPLAIN THE METHODS OF COLLECTING SECONDARY DATA.

(A) Published Sources:

- d) Government publications: A number of government, semi- government and private

organizations collect data related to business, trade, prices, income, health, population etc., These publications are very powerful source of secondary data. Central statistical organization (C.S.O), National sample survey organization (N.S.S.O) office of the Registrar and Census commissioner of India, Directorate of Economic and Statistics and labour Bureau are few of the government publications.

- e) International publications: Various Government in the world and international agencies regularly publish reports on data collected by them on various aspects. Department of the Union and state governments regularly publish reports on a number of subjects. They gather additional information. Some of the important publications are The Reserve Bank of India Bulletin, Census of India, Agricultural Statistics of India, Indian Trade Journal, etc.,
- f) Semi- Government institutions like Municipal corporation, District Board, Panchayat publish reports on the factors like birth, death, health etc.,
- 4. Report of committees and commissions: At times state and central government appoint committees and commissions with a specific reference for study. The report of these committees and commissions provide important secondary data. For example Pay Commission Report, National Agriculture Commission
- 5. Private Publications: The following private publications also enlisted as secondary data. They are
 - A. Journals and Newspapers – Monthly Statistical trade, Economic etc
 - B. Research publications. – Indian Statistical Institute, I.C.A.R
 - C. Publications of Business and Financial Institutions.
 - Sugar Mills Associations, Trade union and Co-operative Societies.
 - D. Articles - Market Reviews and report also provide data for analysis.

Times

(B) Unpublished Sources:

There are various sources of unpublished data. They are the records maintained by various government, and private offices, the researches carried out by individual research scholars in the universities or research institutes. All statistical data are not published. For example, Colleges and Universities maintain records. They collect the details for administrative purposes. Similarly, details collected internally by private Organizations regarding persons, profit, sales, production, etc. become secondary data and are used in certain surveys.

Banks collect certain particulars while giving, advances Stock Exchanges get details of the projects of the companies, and. Government offices gather necessary- information during, registration, issue of permits, licenses, etc. They can provide the necessary data for others.

EXPLAIN THE INTERVIEW SCHEDULE

Meaning: Schedule like the questionnaire is an important survey tool to collect primary data. As Goode and Hatt explain, “Schedule is the name usually applied to a set of questions which are asked and filled by an interviewer, in a face to face situation with another.” The schedule and questionnaire are similar in every way. The major difference is that questionnaire is filled up by the interviewer or investigator on the basis of discussion with the respondent. Hence the schedule may have two types of questions. The first category is direct questions.

Features

1. The interviewer questions are asked, presents he notes down the schedule and the answers
2. The list of questions is a note format document, it need no be attractive
3. The schedule can be used in a very narrow sphere of social research

Importance/Purpose

1. To provide a standardized tool for observation or interview in order to attain objectivity
2. To act as memory tickler, the schedule keeps the memory of the interview
3. To facilitate the work of tabulation and analysis.

EXPLAIN THE GUIDELINES FOR CONSTRUCTING SCHEDULE

- a. **Study the different aspects of the problem:** The problem under study should first of all split up in to various aspects. The determinations of these aspects will depend upon clear understanding of the problem under study.
- b. **Sub-divide the problem to get necessary information:** Each aspect has again to be broken up in to a number of sub parts. These sub parts should complete picture of the aspects under study.
- c. **The framing of actual questions:** Proper care should be taken to see that the questions convey the exact sense is easily followed by the respondents and they will be willing to supply information without any habitation, bias of facts.
- d. **Serialization of questions;** In order to obtain well organized information, it is necessary that the questions should be presented to the respondents in a well order serial.
- e. **Testing the validity of schedule:** Whatever may be the degree of pre caution taken, some steps are bound to be left out and cannot be located unless the schedule has been put in to operation.

EXPLAIN VARIOUS TYPES OF SCHEDULES.

Types Of schedule:

1. Rating Schedule:

They are used in sociological and psychological research. They are useful where opinions, attitudes, behavior are to be measured. Different ranks or scales are constructed and rating is done on its basis.

2. Document Schedule:

As the name suggests, these schedules are used for recording data from case histories, documents, official records, autobiographies etc. They help as the source material for collecting preliminary data. Tabulations can be done from the schedules mechanically or manually.

3. Institutional survey forms: the use of these schedules as is evident from the name is made to gather data about specialized institutions or agencies.

4. Observational Schedule: In this schedule, the observer records the activities and responses of an individual or a group under specific conditions

5. Interview Schedule:

Normally the term schedule is used in research to refer to the interview schedule. These schedules contain questions to be asked by the interviewer and the answers are to be written in blank tables.

(k) Characteristics of a Good schedule: Pauline .V Young givestwo essential characteristics of a good schedule.

1) Accurate communication

2) Accurate response

1. Accurate communication: accurate communication refers to the ability of the schedule to be understood properly by the respondents, i.e. the questions should be properly worded, so that there is no ambiguity in questions as well as answers.

2. Accurate response: Accurate response refers to the ability of the schedule to get the information required in the proper manner. This should be unbiased and true. A major requirement in this direction is that the schedule should be short. It must have simple questions. Schedule must be in attractive form style. Questions should be related to the problem being studied. The questions should be so framed to help in the easy tabulation of the information obtained.

MEANING OF SAMPLE:

Sample is a part of the universe, which we select for the purpose of investigation. A sample should exhibit the characteristics of the universe. A sample is a sample specimen or separated part of the whole population representing its general qualities.

Blalock and Blalock define a sample as “it is a small piece of the population obtained by a probability process that mirrors, with known precision, the various patterns and sub-classes of the population”.

FEATURES OF SAMPLE:

- a. It must be a representative of the population which must be valid. The validity of sample depends upon its accuracy and precision
- b. Accuracy means the degree to which bias is absent from the sample. An accurate sample is one which represents the population
- c. The sample must yield accurate estimate. Precision is measured by the S.T. Error or standard deviation of the sample estimate. The smaller the set error, the higher is the accuracy.
- d. A good sample must be adequate in order to be reliable.
- e. Samples should be selected at random that is, there should not be any bias in the selection of sampling elements.

MERITS OF SAMPLE:

12. It saves time, because fewer items are collected and processed. When the results are urgently required, this method is very helpful.
13. It reduces cost: Only a few and selected items are studied in sampling. So there is reduction in cost of money and reduction in terms of man-hours.
14. Sampling provides more detailed information. As it saves time, money and energy, we can collect more detailed information in a sample survey.
15. Sampling method is sometimes the only method possible. If the population under study is infinite, sampling methods is the only method to be used.

INTRODUCTION TO SAMPLING DESIGN:

A sample design is a definite plan for obtaining a sample from a given population. It refers to the technique or the procedure the researcher would adopt in selecting items for the sample. Sample design may as well lay down the number of items to be included in the sample design is determined before the data are collected. There are many sample designs from which a researcher can choose. Some designs are relatively more precise and easier to apply than others. Researcher must select or prepare a sample design which should be reliable and appropriate for his research study.

Define Population.

The population is a complete set of all possible observations of the type which is to be investigated.

Define Finite population.

In population when the number of observation can be counted and definite, it is known as finite population.

Define Infinite population

When the number of observation cannot be measured on number and is infinite, it is known as infinite population. Information on population is collected in two-ways. Census and sample method.

DEFINE CENSUS METHOD:

The object of a census or complete enumeration is to collect information for each and every unit of the population. In census or universal coverage every element of the population is included in the investigation. When we make a complete enumeration of all items in the population, it is known as census method of collection of data.

CENSUS AND SAMPLE SURVEY:

The term census denotes a total record of individual elements, or units in defined population. In other words, it is a complete enumeration of all items in the 'population'. Census survey can be presumed that in such an inquiry, when all the items are covered, no element of chance is left and highest accuracy is obtained. But it is not possible in real life. There is no way checking the element of bias except through resurvey or use of sample checks. Besides, this type of inquiry takes more time, money and effort in its process.

MERITS AND DEMERITS OF CENSUS METHOD:

Merits:

1. The data are collected from each and every item of the population
2. The results are more accurate and reliable, because every item of the universe is enquired.
3. The data collected may be used for various surveys, analysis etc.,

Demerits:

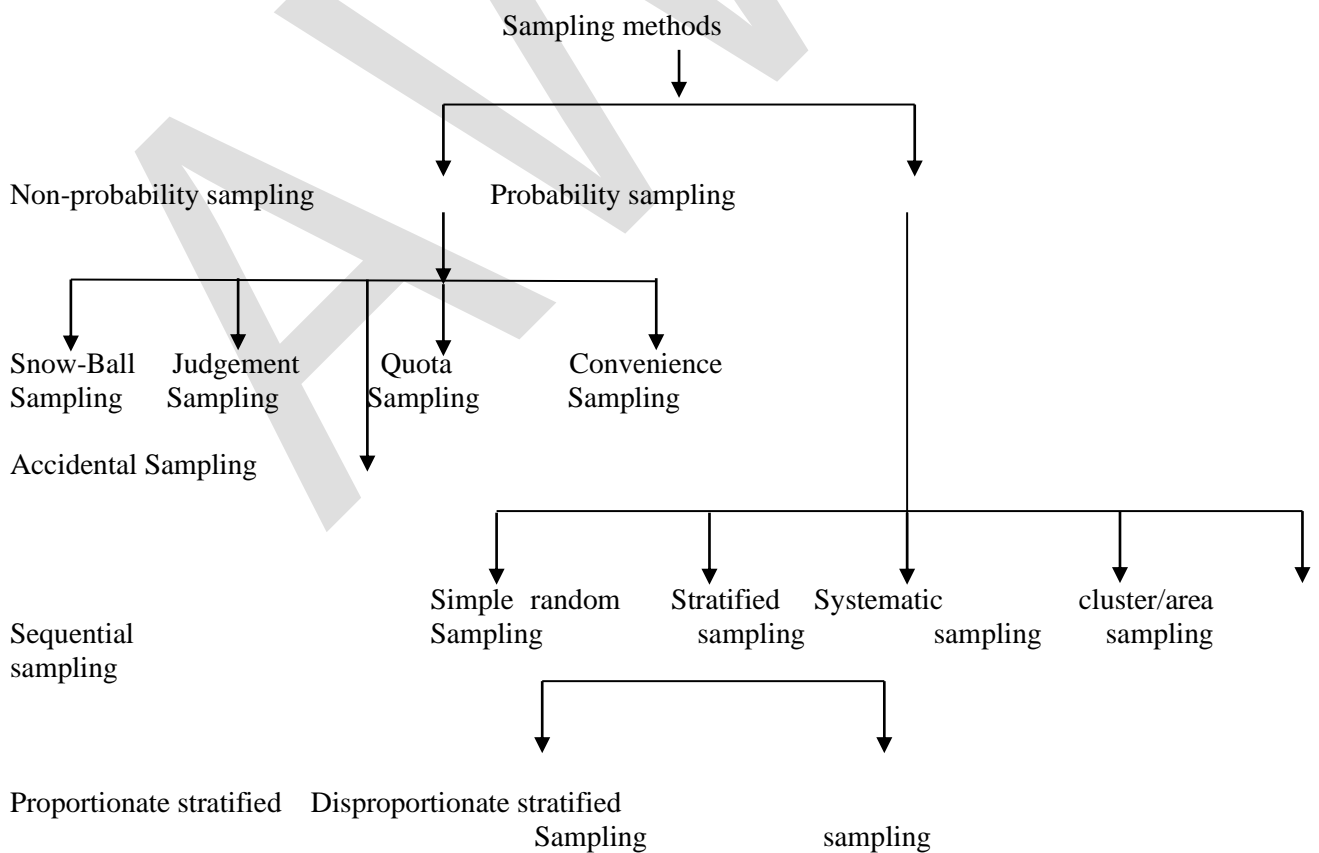
1. It requires a large number of enumerators and it is a costly method. Therefore govt. alone can use this method for conducting population census, production census etc.,
2. It requires more money, labour, time, energy etc.,
3. It is not possible in some circumstances where the universe is infinite.

EXPLAIN TYPES OF SAMPLING TECHNIQUES OR DIFFERENT TYPES OF SAMPLING DESIGN

The various methods of sampling can be grouped under two broad heads: probability sampling (also known as random sampling) and non-probability sampling (non-random sampling).

Probability sampling methods are those in which every item in the universe had a known chance of being chosen as sample. Non-probability sampling methods are those which do not provide every item in the universe with a known chance of being included in the samples. The selection process is partial.

The chart below depicts the sampling methods that are popularly used in practice.



**RANDOM AND NON RANDOM SAMPLING:
PROBABILITY SAMPLING METHODS**

1) Simple or Un-Restricted random sampling

Simple random sampling refers to the sampling technique in which each and every unit of the population has an equal opportunity of being selected in the sample. To ensure randomness of selection one may adopt either lottery method or consult table of random numbers.

Lottery method:

Under this method all the items of population/universe is numbered on separate slips of paper. These slips are then folded and filled up in a container or drum. A blind fold selection is then made of the number of slips required to contribute the desired sample size. Thus, the selection of item depends entirely on chance.

Table of random numbers

The random numbers are generally obtained by some mechanism which, when repeated, a large number of items ensure approximately equal frequencies for the numbers from 0 to 9 and also for proper frequencies for the various combinations of numbers (such as 00,01.....99,000,001,.....99, etc..) that could be expected in a random sequence of the digits 0 to 9. Several standard tables of random numbers are available, among which the following may be specially mentioned, as they have been tested extensively for randomness.

(l) Tippet

(m) Fisher and Yates

(n) Advantages of simple random sampling:

- g) All elements in the population have an equal chance of being selected.
- h) Of all the probability sampling techniques, simple random sampling is the easiest to apply.
- i) It is the more simple type of probability sampling to understand.
- j) It does not require a prior knowledge of the true composition of the population.

Disadvantages of simple random sampling:

- (g) It is often impractical, because of non-availability of population list, or of difficulty in enumerating the population.
- (h) This technique does not ensure proportionate representation to various groups constituting the population.
- (i) The sampling error in this sampling is greater than that in other probability samples of the same size, because it is less precise than other methods.
- (j) A simple random design may be expensive in time and money.

2) Systematic sampling or fixed interval method:

A systematic sample is formed by selecting one unit at random and then selecting additional unit at evenly spaced intervals until the sample has been formed.

Advantages of systematic sampling:

- (o) It is much simpler than random sampling. It is easy to use.
- (p) It is easy to instruct the field investigators to use this method.
- (q) This method may require less time. A researcher operating on a limited time schedule will prefer this method.
- (r) This method is cheaper than simple random sampling.
- (s) Sample is spread evenly over the population,

Disadvantages of systematic sampling:

- (e) This sampling cannot be considered to be a probability sampling in the strict sense of the term.
- (f) As each element does not have an equal chance of being selected, the resulting sample is not a random one. For studies aiming at estimations or generalizations, this disadvantage would be a serious one.
- (g) This method may sometimes give a biased sample.

Restricted random sampling

3. Stratified sampling

This is an improved type of random or probability sampling. In this method, the population is subdivided into homogeneous groups or strata, and from each stratum, random sample is drawn.

Need for stratification: Stratification is necessary for

- d) increasing a sample's statistical efficiency,

- e) providing adequate data for analyzing the various sub-populations, and
- f) Applying different methods to different strata. Stratification ensures representation to all relevant sub-groups of the population.
- g) It is thus more efficient statistically than simple random sampling.
- h) Stratification is essential when the researcher wants to study the characteristics of population subgroups.

The stratified random sampling is appropriate for a large heterogeneous population.

A) Proportionate stratified sampling:

This sampling involves drawing a sample from each stratum in proportion to the latter's share in the total population.

Merits of proportionate sampling:

1. It ensures the representativeness of the sample by giving proper representation to all sub-groups in the population
2. It gives higher statistical efficiency than that given by simple random sampling for a given sample size.
3. It is easy to carry out this sample method

Demerits of proportionate stratified random sampling:

1. A prior knowledge of the composition of the population and the distribution of the population characteristics is required to adopt this method.
2. This method is very expensive in time and money. Of course, its greater efficiency may offset the additional cost.
3. The identification of the strata might lead to classification of errors.

B) Disproportionate stratified random sampling:

This method does not give proportionate representation to strata. It necessarily involves over representation to some strata and under-representation to others. There may be several disproportionate schemes. All strata may be given equal weight may be given weight, even though their shares in the total population vary. Alternatively some substrata may be given greater weight and others lesser weight.

Merits a) It is less time consuming compared with proportionate sampling.

b) It facilities giving appropriate weighting to particular groups which are small but more important.

Demerits:

- 1) This method does not give each stratum proportionate representation. Hence the resulting sample may be less representative.
- 2) This method requires a prior knowledge of the composition of the population, which is not always possible.
- 3) This method is also subject to classification errors. It is possible that the researcher may misclassify certain elements.

Meaning: Cluster sampling means random selection of sampling units consisting of population elements. Each unit is a cluster of population elements. Then from each selected sampling unit, a sample of population element is drawn by either simple random selection or stratified random selection.

4. Cluster sampling: Where the population elements are scattered over a wider area and a list of population elements is not readily available, the use of simple or stratified random sampling method would be too expensive and time-consuming. In such cases cluster sampling is usually adopted.

Advantages of cluster sampling:

6. This method is much easier and more convenient to apply when large populations are studied or large geographical areas are covered.
7. The cost of this method is much less when compared with other sampling methods
8. This method promotes the convenience of field work as it could be done in compact places.
9. Units of study can be readily substituted for other units within the same random section
10. This method is flexible. Where it involves multistage sampling, it is possible to employ different types of sampling in successive stages.

Disadvantages of cluster sampling:

- d) The cluster sizes may vary and this variation could increase the bias of the resulting sample.

- e) The sampling error in this method of sampling is greater. Thus this method is statistically less efficient than other probability sampling methods.
- f) Adjacent units of study (e.g., households) tend to have more similar characteristics than do units distantly apart. This affects the 'representativeness' of the sample and this effect is reflected in a greater sampling error.

5. Sequential sampling: When the number of samples is more than two but how many is neither certain nor decided in advance, this type of system is often referred to as sequential sampling. In brief, we can say that in sequential sampling one can go on taking samples one after another so long as one desires to do so.

Non-probability sampling methods

Non-probability sampling does not adopt the theory of probability and it does not give a representative sample of the population. The primary methods of non-probability sampling are:

- (p) Convenience sampling
- (q) Purposive or Judgement sampling
- (r) Quota sampling
- (s) Accidental sampling
- (t) Snow-ball sampling.

Convenience sampling: This method of sampling involves selecting the sample elements using some convenient method without going through the rigour of sampling method. The researcher may make use of any convenient base to select the required number of samples.

Merits:

1. It is the cheapest and simplest
2. It does not require a list of population and any statistical expertise.

Demerits:

1. It is highly biased, because of the researcher's subjectivity, and so it does not yield a representative sample.
2. It is the least reliable sampling method.
3. The findings cannot be generalized.

Judgement or purposive sampling: A judgement sample is one which is selected according to some one's personal judgement. In other words, the investigator uses his judgement in the choice and includes only those items of the universe in the sample which he considers are most typical of the convenience.

Merits: 1. It is less costly and more convenient

2. It guarantees inclusion of relevant elements in the sample. Probability sampling plans cannot give such guarantee.

Demerits: 1. It does not ensure the representativeness of the sample

2. This is less efficient for generalizing when compared with random sampling
3. This Method requires more prior extensive information about the population one studies.

Quota sampling: In this method, the sample size is determined first and then quota is fixed for various categories of population, which is followed while selecting the sample. Suppose we want to select 100 students, then we might say that the sample should be according to the quota given below: boys 50% , Girls 50% then among the boys, 20% college students, 40% plus two students, 30% high school students and 10% elementary school students. A different or the same quota may be fixed for the girls.

In this method, the quota has to be determined in advance and intimated to the investigator. The quota for each segment of the population may be fixed at random or with a specific basis. Normally, such a sampling method does not ensure representativeness of the population.

Merits:

1. It is considerably less costly than probability sampling
2. It takes less time
3. There is no list of population. Thus quota sampling is a suitable method of sampling a population for which no suitable frame is available.
4. Field work can be easily organized.

Demerits:

1. It may not yield a precise representative sample and it is impossible to estimate sampling error.
2. The quota of sampling is subject to a higher degree of classification error, because the investigators are likely to base their classification of respondents' social status, economic status mostly on their impressions about them.
3. Strict control of field work is difficult.
4. Under this method, Interviewer may tend to choose the most accessible persons; they may ignore slums or areas difficult to reach. Thus they may fail to secure a representative sample within their quota groups.

Accidental sampling: In accidental sampling, the researcher simply reaches out and takes the cases that fall to hand continuing the process till such time as the sample reaches a designated size. The researcher.

Snow-ball sampling: This is the colorful name for a technique of building up a list or a sample of a special population by using an initial set of its members as informants.

Merits:

1. It is very useful in studying social groups and informal groups in a formal organisation
2. It is useful for smaller populations for which no frames are readily available.

Demerits:

1. It does not allow the use of probability statistical methods.
2. It is difficult to apply this method when the population is large
3. It does not ensure the inclusion of all elements in the list.

TYPES OF SAMPLING:

Samples can be either probability samples or non-probability samples. With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researcher to determine this probability. Probability samples are those based on simple random sampling, systematic sampling, stratified sampling, cluster/area sampling whereas non-probability samples are those based on convenience sampling, judgment sampling and quota sampling techniques.

Probability sampling Methods

1. Simple sampling Method
2. Systematic Sampling method
3. Stratified Sampling Method
4. Cluster sampling and area sampling
5. Multi-stage sampling
6. Sequential sampling:

1. Simple sampling Method

This type of sampling is also known as chance sampling or probability sampling where each and every item in the population has an equal chance of inclusion in the sample and each one of the possible samples, in case of finite universe, has the same probability of being same probability of being selected.

2. Systematic Sampling method

In some instances the most practical way sampling is to select every 15th name on a list, every 10th house on one side of a street and so on. Sampling of this type is known as systematic sampling. an element of randomness is usually introduced into this kind of sampling by using random numbers to pick up the unit with which to start. This procedure is useful when sampling frame is available in the form of a list. In such a design the selection process starts by picking some random point in the list and then every nth element is selected until the desired number is secured.

3. Stratified Sampling Method

If the population from which a sample is to be drawn does not constitute a homogeneous group, then stratified sampling technique is applied so as to obtain a representative sample. In this technique, the population is stratified into a number of non-overlapping subpopulations or strata and sample items are selected from each stratum. If the items selected from each stratum based on simple random sampling the entire procedure, the stratification and then simple random sampling, is known as stratified random sampling.

4. Cluster sampling and area sampling

Cluster sampling involves grouping the population and then selecting the groups or the clusters rather than individual elements for inclusion in the sample. Suppose some departmental store wishes to sample its credit card holders. It has issued its cards to 15000 customers. The sample size is to be kept say 450. for cluster sampling this list of 15000 card holders could be formed into 100 clusters of 150 card holders each. Three clusters might then be the simple random sample to ensure the same level of accuracy because in cluster sampling procedural potential for order bias and other source of error is usually accentuated. The clustering approach can, however, make the sampling procedure relatively easier and increase the efficiency of field work, especially in the case of personal interviews.

Area Sampling is quite close to cluster sampling and is often talked about when the total geographical area of interest happens to be big one. Under area sampling we first divide the total area into a number of these smaller areas are randomly selected, and all units in these small areas are included in the sample. Area sampling is especially helpful where we do not have the list of the population concerned. It also makes the field interviewing more efficient since interviewer can do many interviews at each location.

5. Multi-stage sampling

This is a further development of the idea of cluster sampling. this technique is meant for big inquiries extending to a considerably large geographical area like an entire country. Under multi-stage sampling the first stage may be to select large primary sampling units such as states, then districts, then towns and finally certain families within towns. If the technique of random-sampling is applied at all stages, the sampling procedure is described as multi-stage random sampling.

6. Sequential sampling:

This is somewhat a complex sample design where the ultimate size of the sample is not fixed in advance but is determined according to mathematical decisions on the basis of information yielded as survey progresses. The design is usually adopted under acceptance sampling plan in the context of statistical quality control.

Non Probability sampling Methods

- h) Deliberate Sampling
- i) Judgment Sampling
- j) Quota Sampling

1. Deliberate Sampling

Deliberate sampling is also known as purposive or non-probability sampling. this sampling method involves purposive or deliberate selection of particular units of the universe for constituting a sample which represents the universe. When population elements are selected for inclusion in the sample based on the ease of access, it can be called convenience sampling. if a researcher wishes to secure data from, say, gasoline buyers, he may select a fixed number of petrol stations and may conduct interviews at these stations. This would be an example of convenience sample of gasoline buyers. At times such a procedure may give very biased results particularly when the population is not homogeneous

2. Judgment Sampling

In judgment sampling the researcher's judgment is used for selecting items which he considers as representative of the population.

3. Quota sampling:

In stratified sampling the cost of taking random samples from individual's strata is often so expensive that interviewers are simply given quota to be filled from different strata, the actual selection of items for sample being left to the interviewer's judgement. This is called quota sampling.

SIZE OF SAMPLE AND RESEARCH METHODS:

WHAT IS SIZE OF SAMPLE? OR EXPLAIN IT IN DETAIL.

One of the most important issues to be settled while using sampling method is to determine the size of sample. There is a thumb rule, which says that to satisfy statistical requirement, the size of the sample should be minimum of 30 and above. In statistics, any sample with 30 and more elements is considered large sample. Less than 30 elements in a sample constitute only small sample. By definition this might appear to be an easy way out to determine the sample size. But it should be noted that there are several other considerations or factors which influence the sample size.

FACTORS DETERMINING THE SIZE OF SAMPLE:

1. The size of the population: Depending upon the size of population, the size of sample has to be decided. If the population is very small (say for example only 50), then the sample size could also be small. But, it should be remembered that larger the size of population, larger should be the sample size to achieve representativeness and accuracy.

2. The resources available: What amount of time and financial resources are available to the researcher will determine the size of the sample. With sufficient time and large volume of funds available, the sample size could be large, otherwise it should be small.

3. The extent of accuracy desired: One of the requirements of data analysis is the accuracy level. There is no choice about the level of accuracy that one wants to achieve or maintain. Size of sample will be large if accuracy is expected.

4. Nature of population: The similarities and dissimilarities identified with population itself may affect the sample size. If the population contains a lot of heterogeneous sub population (i.e., small segments of population with different features or characteristics), then large sample size is required.

5. Method of sampling adopted: Depending upon the method of sampling used, the size of sample will be decided.

6. Nature of respondents: Success or failure of a sample survey depends ultimately on the response of the informants. So, the nature of respondents will influence the sample size. Suppose in a survey on the opinion of a policy of liberalization, introduced by the Government, if the respondents are literate, the size of sample could be smaller. If the respondents are illiterate, the size of the sample should be large.

SAMPLING AND NON-SAMPLING ERRORS:

Sampling Errors:

The errors which arise because of studying only a part of the total population are called sampling errors. These may arise due to non-representativeness of the sample and the inadequacy of sample size.

1) Biased Errors: These errors arise from any bias in selection and collection information and faulty method of analysis.

2) Unbiased Errors: These errors arise due to change difference between the members of the population. The estimate obtained from a particular sample will differ from the universe value, because the sample selected by chance is not truly representative of the universe. If the researcher took another random sample from the same universe, the resulting estimate might differ a little.

Non-Sampling Errors

This type of error can occur in any survey, whether it may be a complete enumeration or sampling. Non-sampling errors include biases and mistakes. Some of the factors responsible for the non-sampling errors are enumerated here. Vague definition of population; vague questionnaire, conception regarding the information desired, inappropriate statistical unit, inaccurate/inappropriate methods of interview, observation, tabulation, etc., errors committed during presentation and printing of tabulated results. Non-sampling errors tend to increase with the sample size and require be controlling and reducing to a minimum.

Scaling Techniques for Measuring Data Gathered from Respondents

The term scaling is applied to the attempts to measure the attitude objectively. Attitude is a resultant of number of external and internal factors. Depending upon the attitude to be measured, appropriate scales are designed. Scaling is a technique used for measuring qualitative responses of respondents such as those related to their feelings, perception, likes, dislikes, interests and preferences.

TYPES OF SCALES

Most frequently used Scales

1. Nominal Scale

2. Ordinal Scale
3. Interval Scale
4. Ratio Scale

Self Rating Scales

1. Graphic Rating Scale
2. Itemized Rating Scales
 - a. Likert Scale
 - b. Semantic Differential Scale
 - c. Stapel's Scale
 - d. Multi Dimensional Scaling
 - e. Thurston Scales
 - f. Guttman Scales/Scalogram Analysis
 - g. The Q Sort technique

Four types of scales are generally used for Marketing Research.

1. Nominal Scale

This is a very simple scale. It consists of assignment of facts/choices to various alternative categories which are usually exhaustive as well mutually exclusive. These scales are just numerical and are the least restrictive of all the scales. Instances of Nominal Scale are - credit card numbers, bank account numbers, employee id numbers etc. It is simple and widely used when relationship between two variables is to be studied. In a Nominal Scale numbers are no more than labels and are used specifically to identify different categories of responses. Following example illustrates -

What is your gender?

- Male
 Female

Another example is - a survey of retail stores done on two dimensions - way of maintaining stocks and daily turnover.

How do you stock items at present?

- By product category
 At a centralized store
 Department wise
 Single warehouse

Daily turnover of consumer is?

- Between 100 – 200
 Between 200 – 300
 Above 300

A two way classification can be made as follows

Daily/Stock Turnover Method	Product Category	Department wise	Centralized Store	Single Warehouse
100 – 200				
200 – 300				
Above 300				

Mode is frequently used for response category.

2. Ordinal Scale

Ordinal scales are the simplest attitude measuring scale used in Marketing Research. It is more powerful than a nominal scale in that the numbers possess the property of rank order. The ranking of certain product attributes/benefits as deemed important by the respondents is obtained through the scale.

Example 1: Rank the following attributes (1 - 5), on their importance in a microwave oven.

1. Company Name
2. Functions
3. Price
4. Comfort
5. Design

The most important attribute is ranked 1 by the respondents and the least important is ranked 5. Instead of numbers, letters or symbols too can be used to rate in a ordinal scale. Such scale makes no attempt to measure the degree of favourability of different rankings.

Example 2 - If there are 4 different types of fertilizers and if they are ordered on the basis of quality as Grade A, Grade B, Grade C, Grade D is again an Ordinal Scale.

Example 3 - If there are 5 different brands of Talcom Powder and if a respondent ranks them based on say, "Freshness" into Rank 1 having maximum Freshness Rank 2 the second maximum Freshness, and so on, an Ordinal Scale results.

Median and mode are meaningful for ordinal scale.

3. Interval Scale

Herein the distance between the various categories unlike in Nominal, or numbers unlike in Ordinal, are equal in case of Interval Scales. The Interval Scales are also termed as Rating Scales. An Interval Scale has an arbitrary Zero point with further numbers placed at equal intervals. A very good example of Interval Scale is a Thermometer.

Illustration 1 - How do you rate your present refrigerator for the following qualities.

Company Name	Less Known	1	2	3	4	5	Well Known
Functions	Few	1	2	3	4	5	Many
Price	Low	1	2	3	4	5	High
Design	Poor	1	2	3	4	5	Good
Overall Satisfaction	Very Dis-Satisfied	1	2	3	4	5	Very Satisfied

Such a scale permits the researcher to say that position 5 on the scale is above position 4 and also the distance from 5 to 4 is same as distance from 4 to 3. Such a scale however does not permit conclusion that position 4 is twice as strong as position 2 because no zero position has been established. The data obtained from the Interval Scale can be used to calculate the Mean scores of each attributes over all respondents. The Standard Deviation (a measure of dispersion) can also be calculated.

4. Ratio Scale

Ratio Scales are not widely used in Marketing Research unless a base item is made available for comparison. In the above example of Interval scale, a score of 4 in one quality does not necessarily mean that the respondent is twice more satisfied than the respondent who marks 2 on the scale. A Ratio scale has a natural zero point and further numbers are placed at equally

Strongly agree Agree Indifferent Disagree Strongly disagree

Each statement is assigned a numerical score ranging from 1 to 5. It can also be scaled as -2 to +2.

-2 -1 0 1 2

For example quality of Mother Dairy ice-cream is poor then Not Good is a negative statement and Strongly Agree with this means the quality is not good.

Each degree of agreement is given a numerical score and the respondents total score is computed by summing these scores. This total score of respondent reveals the particular opinion of a person.

Likert Scale are of ordinal type, they enable one to rank attitudes, but not to measure the difference between attitudes. They take about the same amount of efforts to create as Thurston scale and are considered more discriminating and reliable because of the larger range of responses typically given in Likert scale.

A typical Likert scale has 20 - 30 statements. While designing a good Likert Scale, first a large pool of statements relevant to the measurement of attitude has to be generated and then from the pool statements, the statements which are vague and non-discriminating have to be eliminated.

Thus, likert scale is a five point scale ranging from 'strongly agreement'to 'strongly disagreement'. No judging gap is involved in this method.

b.Semantic Differential Scale

This is a seven point scale and the end points of the scale are associated with bipolar labels.

1 2 3 4 5 6 7
 Unpleasant Pleasant
 Submissive Dominant

Suppose we want to know personality of a particular person. We have options-

1. Unpleasant/Submissive
2. Pleasant/Dominant

Bi-polar means two opposite streams. Individual can score between 1 to 7 or -3 to 3. On the basis of these responses profiles are made. We can analyse for two or three products and by joining these profiles we get profile analysis. It could take any shape depending on the number of variables.

c.Stapel's Scale

- It was developed by Jan Stapel. This scale has some distinctive features:-
- Each item has only one word/phrase indicating the dimension it represents.
- Each item has ten response categories.
- Each item has an even number of categories.
- The response categories have numerical labels but no verbal labels.

For example, in the following items, suppose for quality of ice cream, we ask respondents to rank from +5 to -5. Select a plus number for words which best describe the ice cream accurately. Select a minus number for words you think do not describe the ice cream quality accurately. Thus, we can

select any number from +5, for words we think are very accurate, to -5, for words we think are very inaccurate. This scale is usually presented vertically.

d. Multi Dimensional Scaling

It consists of a group of analytical techniques which are used to study consumer attitudes related to perceptions and preferences. It is used to study-

- I. The major attributes of a given class of products perceived by the consumers in considering the product and by which they compare the different ranks.
- II. To study which brand competes most directly with each other.
- III. To find out whether the consumers would like a new brand with a combination of characteristics not found in the market.
- IV. What would be the consumers ideal combination of product attributes.
- V. What sales and advertising messages are compatible with consumers brand perceptions.

What is pretesting in research methodology?

A field **pretest** is a dress rehearsal for a **SURVEY**. These **PILOT** tests are extremely useful tools, allowing **researchers** to identify potential problems with survey items and/or data collection **PROTOCOLS** prior to fielding a **study**.

WHAT ARE THE PRINCIPLES OF PILOT STUDY?

Following are the basic principles:

- (h) It is to be conducted among a random sample of the universe.
- (i) Adequate number of questionnaire should be sent under pilot study.

MEANING OF PRE-TESTING:

Common sense suggests the necessity of doing a few test interviews or sending out trial forms by way of preparing for the main survey, and such informal trial and error is as much part of the preliminary study as are talk with experts and study of the literature. But it is necessary to go further, and to try out systematically all the various features of the main inquiry. This may take the form, first, of a series of small 'pre-tests' on isolated problems of the design, and then of the broad plan of the main survey.

WHAT IS PRE-TESTING OF QUESTIONNAIRE?

- a) Pre-testing is the process in which a questionnaire is tested with limited respondents before it is sent to the entire sample unit.
- b) It is done mainly for checking the validity and reliability of the technique to be adopted.
- c) The pre-test involves debriefing and protocol analysis.
- d) The procedure of asking the respondents to explain their answers, to state the meaning of each question and describe the problem they face in answering the questions. It is called as debriefing.
- e) The protocol analysis envisages thinking while completing the questionnaire.
- f) The project director is responsible for conducting pre-test.
- G) The respondents selected under pre-test should represent the entire sample size. In the light of a pre-test, I questionnaire can be modified.

WHAT IS PILOT STUDY? WHAT ARE ITS ADVANTAGES?

Meaning of a pilot study:

Pilot study is a preliminary study conducted on a limited scale before the original studies are carried out in order to gain some primary information, on the basis of which the main project would be planned and formulated. The preliminary survey of the universe in question helps to acquire a

general knowledge about the problem which ultimately helps to know the nature and different aspects of the problem.

Advantages:

- 1. Helps in the respondent and selection procedure:** It helps in bringing out the inadequacies of the draft questionnaire
- 2. Provides training and motivation to interviewer** It unfolds how effective the training has been ridding the interviewer from their prejudices and in motivating them.
- 3. Inculcates seriousness and honesty in interviewer** It also helps in finding out the type of person most likely to be a good interviewer in the study
- 4. Provides opportunities** The interviewers learn a variety of tactics and codes of conduct, which they should follow to build rapport with the respondent.
- 5. Provides a trial or rehearsal to test interviewers work** It test the interviewer's stamina to work under conditions of personal discomfort, stress ad fatigue.

WHAT ARE THE PRINCIPLES OF PILOT STUDY?

Following are the basic principles:

- (a) It is to be conducted among a random sample of the universe.
- (b) Adequate number of questionnaire should be sent under pilot study.

UNIT-IV

ANALYSIS AND INTERPRETATION OF DATA:

INTRODUCTION:

Analysis and interpretation of data are the creative aspect of research. The first is a matter of reorganizing the material that is already available which depends upon the skill of the researcher and interpretation requires either statistical analysis or qualitative classifications. Analysis of data comes prior to interpretation. But there two operations are mixed up and hence cannot be regarded as two separate operations. The data that have been collected by following whatever method will be in the form of raw data. The first step in analyzing that data will be to prepare these data for the type of analysis the researcher plans to carry out. The collected data must undergo some processing like

- (u) Editing
- (v) Coding and
- (W) tabulation

WHAT IS EDITING? STATE ITS GUIDELINES.

Editing is the first step in data processing. Editing can be defined as the process of examining the data collected in questionnaire or schedules to detect errors and omission and to see that they are corrected and the schedules prepared for tabulation.

Guidelines: Following are the guidelines which are to be followed while editing the data:

- (j) Editor should be familiar with the instructions given to the interviewers.
- (k) He should not destroy or erase the original entry.
- (l) All answers changed must be initialled by the editor.
- (m) Editor's initial and date of editing must be mentioned on each schedule completed.
- (N) Incorrect answers should be discarded.

WHAT IS CODING? STATE THE RULES RELATING TO CODING.

Coding is the process of assigning numerals or other symbols to answers for a question. Each answer is assigned a code. Coding is a practice which simplifies recording of answers. When for

a question could be indicated each answer is assigned a code. Classifying the data edited into number of groups. In other words, coding involves two important operations:

16. Deciding the categories to be used and
17. Allocating individual answers to them

Rules:

- (t) Give code numbers for each respondent for identification.
- (u) Give code number for each response.
- (v) Give numbers for qualitative response also.
- (w) Do not delegate the work of categorization to others.
- (x) Design the instructions to the coders.
- (Y) Have a random checking of the coded items.

WHAT IS CLASSIFICATION OF DATA? STATE ITS TYPES.

Classification of data is the process of grouping the data under various understandable homogeneous groups for the purpose of convenient interpretation.

Types:

- k) Classification on periodical basis
- L) Classification on area basis

WHAT IS TRANSCRIPTION? WHAT ARE ITS METHODS?

Transcription is the process of transferring information from an interview schedule to a card so that there is one card corresponding to each unit in the survey population.

It is the process of transferring data contained in questionnaire to another material for the purpose of tabulation.

Types:

- (k) List and tally method.
- (l) Card sort and count method.
- (m) Strip method.
- (n) Punch card method.

WHAT IS TABULATION? WHAT ARE ITS METHODS?

After the transcription of data is over, data are summarized and arranged in a compact form for further analysis. This process is called tabulation.

A table contains columns and rows. These columns and rows create small boxes which are called as cells. Entries made in each are understood with the title of the column and the row.

- (c) Manual tabulation.
- (d) Mechanical tabulation.
- (E) Electronic data processing.

EXPLAIN THE GENERAL RULES RELATING TO TABULATION.

Following rules are to be followed while preparing table:

11. Title: the table should be first given a brief, simple and clear title which may express the basis of classification.
12. Columns and rows: each table should be prepared in just adequate number of columns and rows.
13. Captions and stubs: The columns and rows should be given simple and clear captions and stubs.
14. Ruling: Columns and rows should be divided by means of thin or thick ruling.
15. Arrangement of items: Comparable figures should be arranged side by side.
16. Size of column: This should be according to requirement.
17. Special emphasize: This can be done by writing important data in bold letters.
18. Unit of measurement: The unit of measurement must be mentioned below the title.
19. Foot notes: It must be mentioned below the table, if necessary.
20. Total: Totals of each column and grand total should be in one line.

WHAT IS ANALYSIS OF DATA? STATE ITS TYPES.

Meaning: Analysis of data means studying the tabulated materials in order to determine inherent facts (or) meaning. It involves breaking down existing complex factors into simpler parts and putting the part together in new arrangements for the purpose of interpretation.

Types of Analysis: Analysis may be categorized as

- g) Descriptive analysis and
- (ii) Inferential analysis.

(i) Descriptive analysis: This analysis describes the nature of an object under the study. This sort of analysis may describe data on one variable.

It consists of

- k) Multiple regression analysis
- l) Multiple discriminate analysis
- m) Canonical analysis
- n) Factor analysis

(ii) Inferential analysis: This is concerned with drawing inferences and conclusions from the finding of a study.

WHAT IS INTERPRETATION OF DATA? WHAT ARE ITS ESSENTIALS?

Analysis is not complete without interpretation and interpretation cannot proceed without analysis. Interpretation means application of logical thinking and derivation to the facts to understand and explain the line between variables.

ESSENTIALS (OR) PRE-REQUISITES FOR INTERPRETATION:

Following are some of the pre-conditions for effective interpretation of data.

i. Accurate data: This is the most important pre-requisites of interpretation and analysis. Accurate data means the facts collected should be relevant to the research study. In the absence of such materials, the investigator fails to interpret the data in a proper and required form.

ii. Sufficient data: More collection of accurate data cannot ensure success in interpretation. Along with that, the adequate data should be available.

iii. Homogeneous data: Data homogeneity means uniformity in the features of collected data. If the data are heterogeneous, it may fail to yield the desired results.

Ex: Rs, \$

iv. Possibility for statistical treatment: Every data (or) information is not suited to statistical treatment. If information available is scarce, proper interpretation and statistical analysis are not possible. Researcher should know where the tool should be applied, what type of data are required for applying tool, what the analytical tool means, how to apply the tool etc., in the absence of this correct interpretation is not possible. Majority of researchers are weak in respect of application of types of tools. Whether to apply simple tools (or) advanced tools? It should be determined on the basis of objectives of research.

v. Consistency of information: In consistent information and data are always subject to inaccurate results. In the absence of consistent data, the application of statistical method is not only difficult, but might give different results at different occasions.

WHAT IS HYPOTHESIS? WHAT ARE THE CHARACTERISTICS OF A GOOD HYPOTHESIS?

Meaning:

The formulation of hypothesis is the important step in the process of formulation of research problem. Once the researcher knows the problem he makes guesses. The guesses he makes are the hypothesis which either solve the problem (or) guide him in future investigation.

Ex: 1. Increase in absenteeism in colleges is due to increasing unemployment among educated young students.

2. The small family concept gives place to increasing number of old age homes.

It is a tentative statement, which may (or) may not be happen (or) true.

Definitions

A hypothesis is a tentative generalization, the validity of which remains to be tested. At the elementary level, it may be mere intuition, guess and imaginative data, which becomes the basis of action (or) investigation.

According to Goole and Hah, "Hypothesis is a proposition, which can be put to test to determine validity".

CHARACTERISTICS OF HYPOTHESIS

(1) Conceptual clarity: A hypothesis should be conceptually clear. When hypothesis is conceptually

clear, it provides a clear direction to the researcher. Clarity can be obtained by means of defining operational concepts.

(2) Scope for verification: Hypothesis should be agreeable for verification empirical. Moral verification is not sufficient.

(3) Specific: The hypothesis should be very clear and not a general statement. It should be constructed with simple languages.

(4) Testable: Hypothesis formulated should be testable with the available technique of analysis. It should not be a moral judgement. It should be possible to collect empirical evidences to test hypothesis.

(5) Availability of Techniques: Hypothesis should be related to available techniques. Other wise they will be researchable. Therefore, researcher must make sure that methods are available for testing his proposal hypothesis.

(6) Linked to Theory: Hypothesis should facilitate establishing relationship with a body of theory.

(7) Consistency: Hypothesis should be logically consistent.

(8) Simplicity: A hypothesis should be simple one requiring fewer conditions (or) assumptions

ESSENTIALS (OR) PRE-REQUISITES FOR INTERPRETATION VARIOUS TYPES OF HYPOTHESIS

Hypotheses are classified in several ways. They are given below:

Descriptive Hypotheses

These are propositions that describe the characteristics (such as size, form or distribution) of a variable. The variable may be an object, person, organization, situation or event.

Some examples are:

“The rate of unemployment among arts graduates is higher than that of commerce graduates.”

“Public enterprises are more amenable for centralized planning”

Relational Hypotheses

These are proportions which describe the relationship between two variables. The relationship suggested may be positive or negative correlation or casual relationship.

Some examples are:

“Families with higher incomes spend more for recreation”

“The lower the rate of job turnover in a work group, the higher the work productivity”

“Upper-class people have fewer children than lower-class people”

Casual hypotheses:

State that the existence of, or a change in, one variable causes or leads to an effect on another variable. The first variable is called the independent variable, and the latter the dependent variable. When dealing with casual relationships between variables the researcher must consider the direction in which such relationships flow. i.e., which is cause and which is effect.

Working hypotheses

While planning the study of a problem, hypotheses are formed. Initially they may not be very specific. In such cases, they are referred to as “Working Hypotheses” which are subject to modification as the investigation proceeds.

Null Hypotheses {H₀}

These are hypothetical statements denying what are explicitly indicated in working hypotheses. They are formed in the negative statement.

For example “There is no relationship between families” income level and expenditure on recreation”. Null hypotheses are formulated for testing statistical significance, since; this form is a convenient approach to statistical analysis. As the test would nullify the null hypotheses, they are so called.

There is some justification for using null hypotheses. They conform to the qualities of detachment and objectivity to be possessed by a researcher. If the attempts to test hypothesis which he assumes to be true, it would appear as if he is not behaving objectively. The problem does not arise when he uses null hypotheses.

Moreover, null hypotheses are more exact. It is easier to reject the contrary of a hypothesis than to confirm it with complete certainty. Hence the concept of null hypothesis is found to be very useful.

Alternate Hypothesis {H_a}

It is a statement which is accepted, after a null hypothesis is rejected based on the test result.
Ex: If the null hypothesis is that “there is no relationship between the eye colour of husbands and wives”, it is rejected then automatically the alternative hypothesis is that “there is relationship between the eye colour of husbands and wives is accepted.

Statistical hypotheses

These are statements about a statistical population. These are derived from a sample. These are quantitative in nature in that they are numerically measurable, e.g., “Group A is older than Group B.”

Statistical hypotheses may be hypotheses of difference or hypotheses of association. The latter specify the relations between variables. This association is measured by the co-efficient of correlation, e.g. if the co-efficient of correlation between bonus and productivity is +1.0, then there is a perfect positive correlation between the bonus and productivity.

Common sense Hypotheses:

These represent the common sense ideas. They state the existence of empirical uniformities perceived through day to day observations.

“Soldiers from upper-class are less adjusted in the army than lower class men”.

“Fresh students conform to the conventions set up by seniors”

Common sense statements are often a confused mixture of clichés and moral judgements. Scientists have a large-scale job in transforming and testing them. This requires three tasks: “first, the removal of value judgements; second the clarification of terms; and third, the application of validity tests. What everybody knows is not known until it has been tested. The simple level hypotheses that seek empirical generalization play an important role in the growth of a science.

Complex Hypotheses:

These aim at testing the existence of logically derived relationships between empirical uniformities. For example,

“The concentric growth circles characterize a city”,

“Members of minority groups suffer from oppression psychosis”, etc. such hypotheses are purposeful distortions of empirical exactness. Because of their removal from empirical reality, these constructs are termed ‘ideal types’. The function of such hypotheses is to create tools and problems for further research in otherwise very complex areas of investigation.”

Analytical Hypotheses

These are concerned with the relationship of analytic variables. These hypotheses occur at the highest level of abstraction. These specify relationship between changes in one property and changes in another. For example, the study of human fertility might show empirical regularities by wealth, education. Region and religion. If these were raised to the level of ideal type formulation, one result might be the hypotheses: “These are two high-fertility population segments in India, viz., low-income urban Muslims and low-income rural low caste Hindus.” At a still higher level of abstraction, the effects of region, education, and religion on fertility might be held constant. This would allow a better measurement of the relation between the variables of wealth and fertility.

WHAT ARE THE SOURCES OF HYPOTHESIS?

(1) Theory: This is one of the main sources of hypotheses. It gives direction to research by stating what is known. Logical deduction from theory leads to new hypotheses. For example, profit/wealth maximization is considered as the goal of private enterprises. From this assumption, various hypotheses are derived. “The rate of return on capital employed is an index of business success”; “The optimum capital structure is that combination of debt and equity which leads to the maximum value of the firm.” “Higher the earning per share, more favourable is the financial leverage.”

(2) Observation: Hypotheses can be derived from observation. From the observation of price behaviour in a market, for example, the relationship between the price and demand for an article is hypothesized.

(3) Analogies: Are another source of useful hypotheses. Casual observations in nature or in the frame work of another science may be a source of hypotheses. For example, the hypotheses that “Similar human types or activities may be found in similar geophysical regions” came from plant ecology.

(4) Intuition and personal Experiences: May also contribute to the formulation of hypotheses. Personal life and experiences of persons determine their perception and conception. These may, in

turn, direct a person to certain hypotheses more quickly.

(5) Findings of Studies: Hypotheses may be developed out of the findings of other studies in order to replicate and test.

(6) Culture: Another source of hypotheses is the culture on which the researcher was nurtured.

(7) Continuity of Research: The continuity of research in a field itself constitutes an important source of hypotheses. The rejection of some hypotheses leads to the formulation of new ones capable of explaining dependent variables in subsequent researches on the same subject.

WHAT IS FORMULATION OF HYPOTHESIS?

MEANING:

Formulation of hypothesis is important part of social science research. It is the first step that the researcher should take because a hypothesis states what one is looking for. It is a guide to the researcher. It determines the nature of facts to be collected and the methodology to be adopted for this purpose. It prevents investigator from collecting non-essential and useless data. Without a hypothesis a researcher is likely to waste most of his time as he does not know what is more relevant for his purpose.

EXPLAIN TESTING OF HYPOTHESIS.

For purpose of Testing of hypothesis, researcher should follow following stages.

(i) The hypotheses should be formulated well. Either null hypotheses or alternate hypotheses or both may be formulated. But they should satisfy the all criteria of good hypotheses.

(ii) Next researcher should verify the hypotheses against the data

(iii) The data subjected to pre-test processing. The necessary editing, coding and tabulation work should have been done so that they are ready for tests designed.

(iv) Researcher should test the hypotheses by appropriate scientific and statistical tools.

(v) The level of significance is determined. Level of significance means level of accuracy the researcher desires to achieve in the process of testing the hypotheses is specified.

Ex: When the researcher states that he would like to be at 95% of accurate, then he should test the hypotheses at 5% level. It means that if the hypotheses are tested for 100 times, 5 times there is scope for committing errors.

(vi) In the process of testing a hypothesis, a researcher may commit two types of error. They are Type I error and Type II error.

Type I error

This error I is committed when the hypothesis is rejected when it should be accepted reject a hypothesis which is true and should not be rejected.

Type II error

Type II error is committed when the null hypothesis is accepted instead of being rejected may accept a hypothesis which is false and should be rejected.

	Accept {H ₀ }	Reject {H ₀ }
H ₀ True	Correct decisions	Type I error
H ₀ False	Type II error	Correct decisions

(vii) Degree of freedom is also determined. It refers to extent to which the sampling process is free from bias or prejudice.

(viii) After subjecting the data to the selected statistical technique, the calculated value would be obtained. This is compared with the Table value of the selected technique to arrive at a conclusion. If the calculated value exceeds the table value, then the hypothesis is rejected. When the calculated value is less than the table value the hypothesis is accepted implying that the difference is only to sampling process.

STATISTICAL ANALYSIS

a) Parametric test, b) Non-parametric test

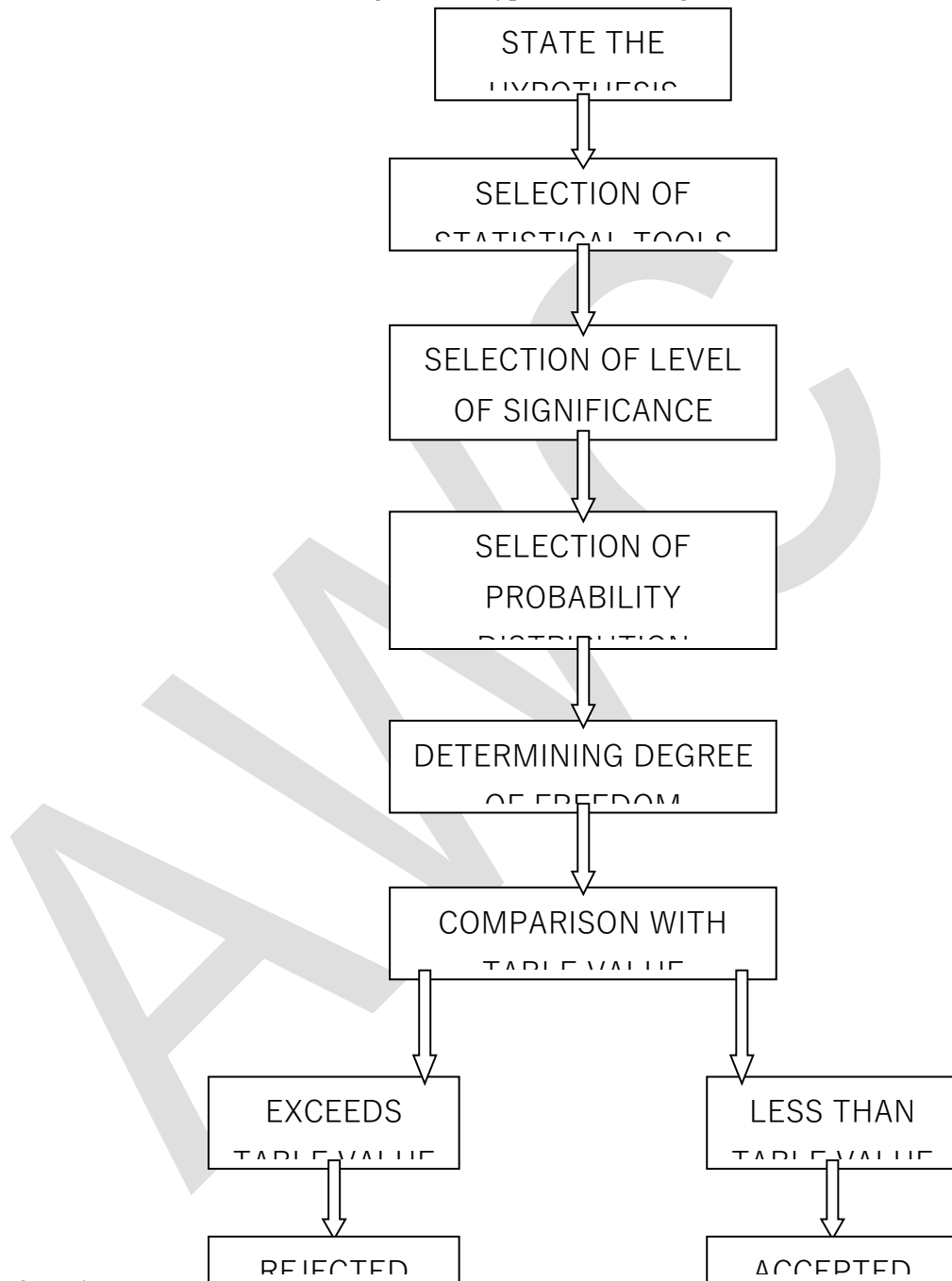
a) Parametric test: (standard test of hypotheses)

They are most powerful and they depend on the parametric or characteristics of the population. They are based on the following assumptions.

i) The observation must of be independent i.e., selection of item should not depend upon the selection of any other item

- j) The population should be normally distributed
 - k) The population should have equal variance
 - l) The data should be measured at least at interval level so that arithmetic operation can be used
- Important Parametric tests are , Z-test, t-test, F-test

Flow Diagram for Hypotheses Testing



Methods of Testing Hypothesis

t-test: t-test was developed by Gossett around 1915. Since he published his findings under a pen name ‘student’ it is known as **Student’s t-test**

T-test is applied for testing hypothesis using sample data. T-test is applicable for small samples when population variance is not known.

T-test is applied for:

- 1) Determining the significance of a sample mean
(Mean of sample – Hypothetical mean of population)

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S \sqrt{N}}$$

N is the size of the sample
S is the standard deviation of the sample

2) Determining the significance of difference between the means of two samples in case of sample. This type of t-test is conducted for two different samples, but drawn from the same population. To conduct this t-test following formula is used

$$\frac{\text{Mean of sample 1} - \text{Mean of sample 2}}{S \sqrt{\frac{n_1 + n_2}{n_1 n_2}}}$$

Where S=combined standard deviation
n1=Number of items in the first sample
n2=Number of items in the second sample

$$S = \sqrt{\frac{(x_1 - \text{mean of sample 1})^2 + (x_2 - \text{mean of sample 2})^2}{n_1 + n_2 - 2}}$$

Where x1 – value given in s1
x2 – value given in s2

3) if two sample are related, then for determining the significance of means of the two related samples.

This type of test is conducted when the two samples have some relationship. That is the elements in one sample are related to the elements in the other sample. The two samples are then considered as dependent samples. In this case following formula is to be used.

Where n is the number of items in the sample

S is the Standard Deviation of the difference in values of first and second samples.

F-test: F-test or variance ratio test is conducted to examine whether two samples could have been drawn from the normal populations having the same variance. Alternatively, it is also used to ascertain whether two independent estimated of population variance differ significantly. This is a very useful test in analyzing data compiled from different population. This test is also used in Analysis of variance to test the significance of the difference between means of more than two samples.

Procedure in F-test:

- (e) Null hypothesis should be formulated.
- (f) Deviated from the mean of actual values of the first sample is computed (X1)
- (g) Each of these deviations is squared (X1²)
- (h) The same is adopted for computing (X2) and (X2²)
- (i) The variance of both the sample is computed to obtain (S1²) and (S2²)
- (j) The sample with greater variance is considered as the numerator and the one with lesser variance is treated as denominator to calculate F ratio
- (k) The degree of freedom (v1) of the sample with greater variance and that of the second sample (v2) are used to locate the Table value of F ratio
- (l) Compare the table value of F with the computed value of F the conclusion is arrived at.

Correlation coefficients: Correlation widely applied as tool of analysis of every subject. In this case the qualitative relationship between two are more variables are expressed. With help of correlation it is possible to indicate the direction of relationship between two or more variables. In research whenever qualitative variables are used, their relationship is studied through correlations.

Types of correlation: Simple correlation:

It is a study of qualitative relationship between two variables. Partial correlation: It involves the study of qualitative relationship between independent variables and dependent variables by holding all other related variables constant. The formula for computing partial correlation is given below Multiple correlations: The multiple correlations show the combined effects of two or more independent variables on a dependent variable. The formula for determining multiple R for two

independent variables is

B) Non-parametric test (distribution test):

The non-parametric tests are population free tests as they are based on the characteristics of population. They non-parametric tests are the only ones usable with nominal data. They are also most appropriate technically correct tests to use with ordinal data.

The important non-parametric tests are the chi-square test, the Median test, U test, etc.,

Characteristics: They do not suppose any particular distribution and the consequential assumptions

- They are quick and easy to use
- They are often not as efficient as parametric test.

THE CHI-SQUARE TEST:

The chi-square test is the most popular non-parametric test of significance in social science research. It is used to make comparisons between two or more nominal variables. Chi-square test is used to make comparisons between frequencies rather than between mean scores.

A chi-square value is obtained by the formula

Conditions to be satisfied for applying chi-square test

- (a) Data should have been collected at random
- (b) Items constituting the sample should be independent
- (c) No group should contain very few items say less than 10
- (d) The overall number of items must be reasonably large. It should be at least 50.

This method is used by all researchers to

- (a) to test the goodness of fit
- (b) test the significance of association between two attributes test the homogeneity.

Finding out the relationship between two variables is known as **Bivariate Analysis**. Chi-square test and ANOVA comes under Bivariate analysis.

Chi-square test (symbolically written as χ^2 –test) is a non-parametric test. It is used most frequently by marketing researcher to test hypotheses. This test is employed for testing hypotheses when distribution of population is not known and when nominal data is to be analyzed. The test is similar in approach as z and t tests. χ^2 test aims at determining whether significant difference exists among groups of data., or whether the differences are due to sampling. χ^2 test is similar to t test in that both depend upon the degrees of freedom involved, the distribution curve is greatly skewed. As the number of degrees of freedom increases, the distribution curve becomes more symmetrical and resembles the normal curve.

Example: A manufacturer of TV sets was trying to find out what variables influenced the purchase of a TV set. Level of income was suggested as possible variable influencing the purchase of TV sets. A sample of 500 households was selected and the information obtained is classified as shown below.

Income Group	Have TV Set	Do Not Have TV Set
Low Income Group	0	250
Middle Income Group	50	100
High Income Group	80	20

Is there evidence from the above data of a relation ownership of TV sets and level of income?

Solution: Let us take the hypothesis that ownership of TV sets is independent of level of income.

Applying

χ^2 test.

$E_{11}=(250*130)/500 = 65$

$E_{12}=(250*370)/500 = 185$

$E_{21}=(150*130)/500 = 39$

The table of expected frequencies shall be as follows:

65	185	250
----	-----	-----

39	111	150
26	74	100
130	370	500

O	E	(O-E) ²	(O-E) ² / E
0	65	4225	65.000
50	39	121	3.103
80	26	2916	112.154
250	185	4225	22.838
100	111	121	1.090
20	74	2916	39.405
Total		$\sum(O-E)^2$	243.59

The formula for calculating $\chi^2 = \sum(O-E)^2 / E$

Degrees of freedom, d.f=(c-1) (r-1) =(2-1) (3-1) =2

Tabular value of χ^2 at 1 d.f at 0.05 confidence level is=5.99

The calculated value of χ^2 is greater than the tabular value. The null hypothesis is rejected. Hence, ownership of TV set is independent of level of income.

Analysis Of Variance (ANOVA) :The Analysis of Variance or F-Test is used in such problems where a researcher wants to test for the significance of the differences between more than two sample means. This is one of the most powerful statistical techniques. The analysis of variance is used in every type of experimental design concerning both natural and social sciences.

Application of ANOVA:The analysis of variance ANOVA is used when (a) each sample is drawn in a random manner from the normal population. Also, the sample statistics tend to reflect the characteristics of the population. And (b) the populations from which the samples are taken have identical means and variances. When we are not able to make these assumptions in a particular problem, the analysis of variance should not be used for that problem. There are two methods of using analysis of variance

- (i) One-way classification and
- (ii) Two-way classification.

One-Way Classification

Example:The three samples below have been obtained from normal populations with equal variances. Test the hypothesis that the sample means are equal.

8	7	12
10	5	9
7	10	13
14	9	12
11	9	14

The table value of F at 5% level of significance for $v_1=2$ and $v_2=12$ is 3.88

Solution: Let us take the null hypothesis that there is no significant difference in the means of three samples. Using ANOVA technique.

X₁

X₂

X₃

8	7	12
10	5	9
7	10	13
14	9	12
11	9	14
Total	50	40

X_1	X_2	X_3
8	7	12
10	5	9
7	10	13
14	9	12
11	9	14
Total	50	40
\bar{X}	10	8

$$\bar{X} = (10+8+12)/3=10$$

Variance between Samples

$(\bar{X}_1 - \bar{X})^2$	$(\bar{X}_2 - \bar{X})^2$	$(\bar{X}_3 - \bar{X})^2$
0	4	4
0	4	4
0	4	4
0	4	4
0	4	4
0	20	20

Sum of squares between samples=0+20+20=40

Variance within Samples

X_1	$(X_1 - \bar{X}_1)^2$	X_2	$(X_2 - \bar{X}_2)^2$	X_3	$(X_3 - \bar{X}_3)^2$
8	4	7	1	12	0
10	0	5	9	9	9
7	9	10	4	13	1
14	16	9	1	12	0
11	1	9	1	14	4
30	16	14			

Sum of squares within samples=30+16+14=60

ANOVA TABLE

Source Of Variation	Sum Of Squares	v	Mean Square
Between	40	2	20
Within	60	12	5
Total	100	14	

$$F=20/5=4$$

For $v_1=2$ and $v_2=12$ is $F_{0.05}=3.88$

The calculated value of F is greater than the table value. The hypothesis is rejected. Hence there is significant difference in the sample means.

Two-Way Classification

Example: A consumer goods manufacturing company wants to test whether its three salesmen: X, Y and Z, tend to make sales of same size or whether they differ in their selling ability as measured by the average size of their sales. During the last week out of 12 sales calls: X made 4, Y made 3 and Z made 5. The following are the weekly sales record of the three salesmen.

X	Y	Z
200	100	500
300	200	400
400	300	300
500		200
		100

Determine whether the three salesmen's average sales differ in size.

Solution: Null hypothesis, H_0 : There is no difference among the average sales volumes of the three salesmen $H_0=\mu_1=\mu_2=\mu_3$. Let us divide each observation by 100. The coded data are:

X_1	X_1^2	X_2	X_2^2	X_3	X_3^2
2	4	1	1	5	25
3	9	2	4	4	16
4	16	3	9	3	9
5	25			2	4
				1	1
$\sum X_1=14$	$\sum X_1^2=54$	$\sum X_2=6$	$\sum X_2^2=14$	$\sum X_3=15$	$\sum X_3^2=55$

Sum of all the items of various samples

$$=\sum X_1+\sum X_2+\sum X_3=14+6+15=35$$

$$\text{Correlation factor } T^2/12 = (35^2)/12=1225/12=102$$

Total sum of squares (SST)

$$\sum X_1^2+\sum X_2^2+\sum X_3^2-T^2/N$$

$$=54+14+55-102$$

$$=123-102=21$$

Sum of squares between samples (SSC)

$$\begin{aligned}
&= (\sum X_1^2/N_1) + (\sum X_2^2/N_2) + (\sum X_3^2/N_3) - (T^2/N) \\
&= (14^2/4) + (6^2/3) + (15^2/5) - 102 \\
&= 49 + 12 + 45 - 102 \\
&= 4
\end{aligned}$$

Sum of squares within samples (SSE) = SST - SSC = 21 - 4 = 17

Analysis Of Variance Table

Sources Of Variation	Sum Of Squares	Degrees Of Freedom	Mean Square	Value of F
Between Samples (or columns)	SSC=4	(k-1)=(3-1)=2	MSC=SSC/(k-1) =4/2	MSC/MSE =4/2*9/17
Within Samples (or rows)	SSE=17	(n-k)-(12-3)=9	MSE=SSE/(n-k) =17/9	
Total	SST=21		n-1=11	F=1.05

Thus, computed F=1.05.

F value at 0.05 level of significance and at 2 and 9 degrees of freedom is 4.26. On comparing the two values of F, we find that the tabular value of F exceeds the computed value. Hence, the null hypothesis is accepted. Hence, it does not exist a significant difference in the selling capabilities of the three salesmen.

Multi-Variant Analysis and Its Techniques:

According to C.R. Kothari, the basic objective underlying multivariate techniques is 'to represent a collection of massive data in a simplified way'. In other words, multivariate techniques transform a mass of observations into a smaller number of composite scores, in such a way that they may reflect as much information as possible contained in the raw data obtained concerning a research study. Thus, the main contribution of these techniques is in arranging a large amount of complex information involved in the real data into a simplified visible form. Mathematically, multivariate techniques consist in 'forming a linear composite vector in a vector subspace, which can be represented of projection of a vector onto certain specified subspaces.

(i) Multiple regressions:

Here, the researcher forms a linear composite of explanatory variables, so that it has maximum correlation with a criterion variable. This technique is more suitable, when the researcher has a single, metric criterion variable which is supposed to be a function of other explanatory variables. The main purpose of the method is to predict the variability of the dependent variable based on its covariance with all the independent variables. According to C.R. Kothari, supposing the linear-multiple regression problem is to estimate constant B₁, B₂, B_k and A such that the expression $Y = B_1X_1 + B_2X_2 + \dots + B_kX_k + A$ provides a good estimate of an individual's score based on his X scores.

(ii) Multiple discriminant analysis

By using this method, a researcher can classify individuals or objects into one or two or more mutually exclusive and exhaustive groups on the basis of a set of independent variables. Here, the researcher can have an interval independent variables and a nominal dependent variable. For instance, suppose, a researcher wants to test brand preference (say brand x or y) is the dependent variable of interest and its relationship to an individuals' income, age, education, etc. he can use the technique of discriminant analysis. **Here, regression analysis is not suitable because the dependent variable is not intervally scaled.**

(iii) Multivariate analysis of variance

It is an extension of bi-variate analysis of variance in which the ratio of among-groups variance to within-groups variance is calculated on a set of variables instead of a single variable. It is a suitable method for a researcher, when several metric dependent variables are involved in a research

study, along with many non-metric explanatory variables. For several non-metric explanatory variables, a researcher can use the ANOVA techniques. However, multivariate analysis is mainly used by the researcher whenever he wants to test hypotheses concerning multivariate differences in group responses to experimental manipulations.

(iv) Canonical correlation analysis

According to **Hotelling**, this analysis will mainly predict a set of criterion variables from their joint co-variance with a set of explanatory variables. Here, both metric and non-metric data can be used. The procedure followed is to obtain a set of weights for the dependent and independent variables in such a way that linear composite of the criterion variables has a maximum correlation with the linear composite of the explanatory variables.

Suppose, a researcher wants to relate grade school adjustment to health and physical maturity of the child, he can then use canonical correlation analysis, provided he has for each child a number of adjustment scores (such as test, teacher’s ratings, parent’s ratings and so on) and also he has for each child a number of health and physical maturity scores (such as heart rate, height, weight, index of intensity of illness and so on.)

The main objective of canonical correlation analysis is, to discover factors separately in the two sets of variables such that the multiple correlations between sets of factors will be the maximum possible.

Model Building And Decision Making: A model of two-group discriminant analysis

A marketer has conducted a survey of 12 potential buyers for his new synthetic knitwear acceptability. He got the following ratings of potential buyers with regard to four product characteristics namely; (i) long standing quality (x1) (ii) light weight (x2), (iii) Washable quality (x3) and (iv) Resistance power (x4). After rating each characteristic, the respondent says whether he will buy or not.

Ratings of research product (Synthetic knitwear)

(0 – very poor to 10

– excellent)

	Long standing quality (x1)	Light weight(x2)	Washable quality (x3)	Resistance power (x4)
Possible buy	9 7 10 8 9 8 7	8 6 7 4 9 6 5	7 6 8 5 3 7 6	6 5 2 4 3 2 2
Mean Rating:	8.29	6.43	6.00	3.43
No buy	4 3 6 2 1	4 6 3 4 2	4 6 3 5 2	6 3 4 2 1
Mean Rating	3.20	3.80	4.00	3.20

The ‘possible buy’ is associated with the high score on longstanding quality and low score with ‘no buy’, we can say that this characteristic discriminates well in the separation of potential buyers from non-buyers, as compared to other characteristics which do not indicate a clear relationship between the score and the buying potential. But such instances might be rare in actual practice

UNIT-V

REPORT WRITING:

Introduction:

After collecting and analyzing the data, the researcher has to accomplish the task of drawing inferences followed by report writing. This has to be done very carefully, otherwise misleading conclusion may be drawn and the whole purpose of doing research may get vitiated. It is only through interpretation that the researcher can expose relations and processes that underlie his findings. In case of hypotheses testing studies, if hypotheses are tested and upheld several times, the researcher may arrive at generalizations. But in case the researcher had no hypothesis to start with, he would try to explain his findings on the basis of some theory. This may at times result in new questions, leading to further researches. All this analytical information and consequential inference(s) may well be communicated preferably through research report, to the consumers of research results who may be either an individual or a group of individuals or some public/private organization.

The final step of research process is to make finding available to the Readers with varied interest. Some reader may be concerned with conclusion arrived at end of the study, some readers are interested in knowing the methodology used; only some readers are interested in inferences of study. Therefore the researcher will have to give a complete & full picture (or) description of the problem. Careful steps have to be taken by the researcher to expose the information in the form of a report. It will greatly help the researcher & the people interested in it.

WRITE THE MEANING OF INTERPRETATION.

Interpretation refers to the task of drawing inferences from the collected facts after an analytical and/or experimental study. In fact, it is a search for broader meaning of research findings. The task of interpretation has two major aspects viz., (i) the effort to establish continuity in research through linking the results of a given study with those of another, and (ii) the establishment of some explanatory concepts. "In one sense, interpretation is concerned with relationships within the collected data partially overlapping analysis. Interpretation also extends beyond the data of the study to include the results of other research, theory and hypotheses." Thus, interpretation is the device through which the factors that seem to explain what has been observed by researcher in the course of the study can be better understood and it also provides a theoretical conception which can serve as a guide for further researches.

WHAT IS REPORT?

Meaning: A research report is an investigative report, or documented paper which is based on the researcher's reading on the selected object. A report is presentation of finding about the fact of one's subject in a clear, orderly, & detailed manner. The report should be more objective oriented & to present the facts on the matter.

EXPLAIN THE SIGNIFICANCE OF REPORT WRITING.

- a. Research report is considered as a major component of the research study for the research task remains incomplete till the report has been presented and or written.
- b. As a matter of fact, even the most brilliant hypothesis, highly well designed and conducted research study and the most striking generalizations and findings are of little value unless they are effectively communicated to others.
- c. The purpose of research is not well served unless the findings are made known to others.

DISTINGUISH BETWEEN TECHNICAL REPORT AND POPULAR REPORT.

- a. Technical report gives more emphasis on methods employed for collection of data & assumptions made in the study where as popular report gives emphasis on simplicity & attractiveness.
- b. Technical report aims at presenting the findings & conclusion whereas popular report aims at findings & their implication.
- c. Technical report mainly focused on analysis & presentation of finding whereas the

- popular report mainly focused on recommended actions for the problem.
- d. In the case of technical report use as many technical jargons as possible. Whereas in the case of popular report avoid the use of popular report.
 - e. Technical report is highly useful only those people who are involved in the particular area. Incase of popular it is useful in all segments people.

EXPLAIN THE LAYOUT OF REPORT/ RESEARCH REPORT.

Anybody, who is reading the research report, must necessarily be conveyed enough about the study so that he can place it in its general scientific context, judge the adequacy of its methods and thus form an opinion of how seriously the findings are to be taken. For this purpose there is the need of proper layout of the report. The layout of the report means as to what the research report should contain. A comprehensive layout of the research report should comprise (A) preliminary pages; (B) the main text; and (C) the end matter. Let us deal with them separately.

(A) Preliminary Pages: In its preliminary pages the report should carry a title and date, followed by acknowledgements in the form of 'Preface' or 'Foreword'. Then there should be a table of contents followed by list of tables and illustrations so that the decision-maker or anybody interested in reading the report can easily locate the required information in the report.

(B) Main Text: The main text provides the complete outline of the research report along with all details. Title of the research study is repeated at the top of the first page of the main text and then follows the other details on pages numbered consecutively, beginning with the second page. Each main section of the report should begin on a new page. The main text of the report should have the following sections:

- (i) Introduction;
- (ii) Statement of findings and recommendations;
- (iii) The results;
- (iv) The implications drawn from the results; and
- (v) The summary.

(i) Introduction: The purpose of introduction is to introduce the research project to the readers. It should contain a clear statement of the objectives of research i.e., enough background should be given to make clear to the reader why the problem was considered worth investigating. A brief summary of other relevant research may also be stated so that the present study can be seen in that context. The hypotheses of study, if any, and the definitions of the major concepts employed in the study should be explicitly stated in the introduction of the report.

The methodology adopted in conducting the study must be fully explained. The scientific reader would like to know in detail about such thing: How was the study carried out? What was its basic design? If the study was an experimental one, then what were the experimental manipulations? If the data were collected by means of questionnaires or interviews, then exactly what questions were asked (The questionnaire or interview schedule is usually given in an appendix)? If measurements were based on observation, then what instructions were given to the observers? Regarding the sample used in the study the reader should be told: Who were the subjects? How many were there? How were they selected? All these questions are crucial for estimating the probable limits of generalizability of the findings. The statistical analysis adopted must also be clearly stated. In addition to all this, the scope of the study should be stated and the boundary lines be demarcated. The various limitations, under which the research project was completed, must also be narrated.

(ii) Statement of findings and recommendations: After introduction, the research report must contain a statement of findings and recommendations in non-technical language so that it can be easily understood by all concerned. If the findings happen to be extensive, at this point they should be put in the summarised form.

(iii) Results: A detailed presentation of the findings of the study, with supporting data in the form of tables and charts together with a validation of results, is the next step in writing the main text of the report. This generally comprises the main body of the report, extending over several chapters. The result section of the report should contain statistical summaries and reductions of the data rather than the raw data. All the results should be presented in logical sequence and spitted into readily identifiable sections. All relevant results must find a place in the report. But how one is to decide about what is relevant is the basic question. Quite often guidance comes primarily from the research problem and from the hypotheses, if any, with which the study was concerned. But ultimately the researcher must rely on his own judgement in deciding the outline of his report. "Nevertheless, it is still necessary that he states clearly the problem with which he was concerned, the procedure by which he worked on the problem, the conclusions at which he arrived, and the bases for his conclusions."

(iv) Implications of the results: Toward the end of the main text, the researcher should again put down the results of his research clearly and precisely. He should, state the implications that flow from the results of the study, for the general reader is interested in the implications for understanding the human behaviour. Such implications may have three aspects as stated below: A statement of the inferences drawn from the present study which may be expected to apply in similar circumstances.

18. The conditions of the present study which may limit the extent of legitimate generalizations of the inferences drawn from the study.

19. The relevant questions that still remain unanswered or new questions raised by the study along with suggestions for the kind of research that would provide answers for them.

It is considered a good practice to finish the report with a short conclusion which summarises and recapitulates the main points of the study. The conclusion drawn from the study should be clearly related to the hypotheses that were stated in the introductory section. At the same time, a forecast of the probable future of the subject and an indication of the kind of research which needs to be done in that particular field is useful and desirable.

(v) Summary: It has become customary to conclude the research report with a very brief summary, resting in brief the research problem, the methodology, the major findings and the major conclusions drawn from the research results.

(C) End Matter: At the end of the report, appendices should be enlisted in respect of all technical data such as questionnaires, sample information, mathematical derivations and the like ones. Bibliography of sources consulted should also be given. Index (an alphabetical listing of names, places and topics along with the numbers of the pages in a book or report on which they are mentioned or discussed) should invariably be given at the end of the report. The value of index lies in the fact that it works as a guide to the reader for the contents in the report.

EXPLAIN THE PRECAUTIONS TO BE OBSERVED WHILE PREPARING EFFECTIVE RESEARCH REPORT.

Research report is the channel of communicating research findings to the readers of the report. A good research report is one which does the task of efficient & effective communications.

(z) The research & sustain report should be enough, to maintain the interest of readers.

(aa) To avoid the use of technical jargons. The research report should convey the matter as simply as possible.

(bb) The reader often interested in acquiring the quick knowledge of the main findings. Therefore, for this purpose, the researcher can use the graphs, charts, statistical diagram, table, diagram to be used which will be given the brief summary of finding.

(cc) The layout of research should be well throughout & must be appropriate in ordinances with the objectives of the research problem.

(dd) The research report should be free from grammatical mistakes, spelling mistakes.

(ee) The reports should present logical analysis of the subject matter.

(ff) The report should show its originality, & should make an attempt to solve the problem.

(gg) Towards the end, the research report should state the policy implications for solving the problems.

(hh) It is also desirable to indicate the scope for further research/researches in the same particular period.

- (ii) The researcher should enlist necessary appendices in respect of technical data in the research report.
- (jj) Bibliography of the sources must be necessarily being given in the proper order with all details.
- (kk) The index may also be considered as an essential part which should be listed at the end.
- (ll) The report should be attractive, closer need, whether typed or printed.
- (mm) The constraints in conducting of the survey or study should be given in the report.
- (nn) The objectives, the nature of the problem, methods employed in analysis, must also be clear which should be presented at the beginning of the report.
- (oo) The techniques of using the quotations, foot notes, Documentations, proper functions & abbreviations of the footnotes etc., to be stated very carefully.

EXPLAIN DIFFERENT TYPES OF RESEARCH REPORT.

1. Technical Report: This report is used when full written report of the study is required for record keeping or for public dissemination. This report is mainly emphasized on the methods employed, assumptions made into the course of the study.

Outline of Technical Report: Summary of result: A brief review of the main finding is given in two or three pages.

- a. **Nature of study :** Technical report includes the nature of study like objectives of the study, formulation of the problem, working of the hypothesis, nature of data required and type of analysis required etc.,
- b. **Methods employed:** It covers the methods used in the study and their limitations may be given.
- c. **Data:** Types of data used are specified here. Sources, characteristics and limitations of data are specified. If secondary data are used, they are fully assessed.
- d. **Presentation findings:** Analysis of data and presentation of the findings of the study with supporting data in the form of tables and charts are narrated.
- e. **Conclusions:** A detailed summary of the findings are explained.
- f. **Bibliography:** Reference of various sources is attached.
- g. **Technical appendices:** Questionnaire, mathematical derivations, elaborations on particular technique of analysis are also attached.
- h. **Index:** Index is prepared and is given in at the end.
- i. The above data need not to be used for all technical purpose but may be used according to the purpose of study. It should be simple presentation & readily available of finding by the use of charts, diagrams, which are desirable for the study.

2. Popular Report: The popular report emphasis on simplicity & attractive is called as popular report. The simplicity refers to the clarity in writing, minimum use of technical & mathematical details, liberal use of charts and diagrams.

Layout of Popular Report:-

- a. Findings & its implications: Popular report gives emphasis on the findings of practical interest and their implications on these findings.
- b. Recommendations for actions: In this report recommendation for action on the basis of finding of the study is given in the report.
- c. Objectives of the study: General problem and specific objectives of the study is given in the report.
- d. Methods employed: A brief description of the all methods and techniques used in the study specified.
- e. Results : It is the main body of report in which the study is presented in clear and non-technical terms with liberal use of illustrations such as charts, diagrams and like
- f. Appendices: Detailed information on methods used, forms used are presented in the form of appendices.
- g. There are several variations of the form in the popular report. The only things which give emphasis on simplicity attractiveness, policy implication form operational point of view avoid the use of technical aspects.

3. Oral Presentation: Oral presentation of report is essential when the study considered being more

effective particularly in the case of policy recommendation indicated by the project research. It gives better understanding of the findings and their implications.

4. Interim Report: A report submitted before expiry of stipulated period of time for the completion of research study. It contains summary of what has been done so far and what were its outcome.

5. Summary Report: It is prepared for the consumption of the lay audience. It is written in non-technical, simple language with a liberal use of pictorial charts. It just contains a brief reference to the objective of the study. It is short report of two or three pages.

6. Research Abstract: It is short summary of the technical report.

7. Research Article: It is designed for publication in a professional journal.

EXPLAIN FORMAT OR CONTENTS OR LAYOUT OF RESEARCH REPORT.

LAYOUT OF THE RESEARCH REPORT

Describe, in brief, the layout of a research report covering all relevant points.

The research report can be of 2 types namely (i) written or (ii) verbal.

Following are the ingredients of a good research report format with regard to a written report.

1. Title Page
2. (a) Contents
 - (b) List of Tables
 - (c) List of Figures
3. Foreword
4. Preface
5. Letter of Transmittal
6. Introduction
7. Review of Literature
8. Statement of Objectives
9. Methodology
 - (a) Research Design
 - (b) Data Collection Methods
 - (c) Sampling
 - (d) Fieldwork
 - (e) Analysis and Interpretation
 - (f) Limitations
 - (g) Scope
10. Results and Findings
11. Conclusions
12. Recommendations and Suggestions
13. Summary (Abstract)
14. Appendices
15. Bibliography

1. TITLE PAGE: It must give the title of the research report

It must give information about who prepared it, who supervised it, who sponsored it, date on which it was presented and place where it was presented

2. (a) CONTENTS: The chapters, sections and other headings used in the report and the pages on which each of them is found are listed here.

(b) LIST OF TABLES: All the tables used to present the data must be given along with the pages on which they have appeared in the report

(c) LIST OF FIGURES: All the figures, charts, diagrams, pictures etc. given within the report must be indicated along with the pages on which they have appeared

3. FOREWORD: It says a few words on the problem and the author

Sometimes, it appears at the end of the report

4. PREFACE:

1. It gives a general introduction to the project and says a few words about its importance. Then a scheme of chapterisation is given. The scheme of chapterisation

contains a brief of the contents presented in each of the chapters of the research report.

2. At the end, the preface contains a section of acknowledgements.
3. The researcher puts his signature, place and date at the end of the preface.

5. LETTER OF TRANSMITTAL: This is a certificate from researcher to the authority sponsoring the research and it describes that the work is original and satisfactory

6. INTRODUCTION: It gives the background of the problem, importance of the problem, dimensionality of the problem, previous research done and relevance of that to the present work

7. REVIEW OF LITERATURE

- a. A review of earlier researches done in relation to the research project is done here.
- b. The research gap is determined and need of study is also justified in this section
- c. All studies carried out earlier are listed out here in a sequence

8. STATEMENT OF OBJECTIVES

- a. The objectives established and to be accomplished during the research are to be highlighted here.
- b. If some hypotheses are to be tested in the research, they are also stated here

9. METHODOLOGY:

It deals with the research design to be used, data collection methods to be used, sampling techniques to be used, field work to be carried out, analysis and interpretation to be done, limitations inherent in the project and finally, coverage (scope) of the work is given here.

(a) RESEARCH DESIGN

- a. It gives details about the exploratory, explanatory or descriptive or experimental nature of the research work
- b. Why a particular design is used and what is its importance, is also put in this section

(b) DATA COLLECTION METHOD

- a. Selection of Primary data or Secondary data collection Method is done here
- b. A copy of the questionnaire or schedule used is to be attached in appendix and its importance is highlighted in this section

(c) SAMPLING PLAN: The details regarding who is to be surveyed (sampling unit), how many are to be surveyed (sample size), how are they selected (sampling design) and how are they reached (sampling media) are given in this section

(d) FIELD WORK

This section deals with the details of the field work to be carried out and methodology for administering the questionnaire or collection of secondary data. Not-at-homes, refusal to cooperate, respondent's bias, and the interviewer's bias are also highlighted.

The data collection errors are to be adjusted and explanation regarding their adjustment in the research work is required to be given

(e) DATA ANALYSIS AND INTERPRETATION

Various statistical tools to be used (like averages, percentages, measures of dispersion, correlation, regression, and different statistical tests) to analyze and interpret the collected data are mentioned here

If advanced techniques like multiple-regression analysis, discriminate analysis, factor analysis, and cluster analysis (which are termed as multivariate techniques for analysis of data) are to be used, these must be mentioned and justification for their use must be put forward in this section of the report.

(f) LIMITATIONS

Various constraints (viz., finance and time) facing the researcher which deter him/her in detailed analysis of the problem may be pinpointed

Various limitations or demerits associated with the research problem must be pointed out in this section

(g) SCOPE

What aspects are to be covered in the research are to be highlighted in brief in this section of methodology

A justification for limiting the research work to these limits is to be provided in this section

10. RESULTS AND DISCUSSION

This part of the research is also called analysis and interpretation. It forms the body of the written report. Results and findings are given and discussed here. This part contains an assortment of tables, charts, graphs and an organized narrative of the results. Each table, graph and picture is followed by a detailed summary interpreting that. The study objectives must be kept in mind while presenting results. Only those information which have bearing on the objectives of the research should be included in the report.

11. CONCLUSIONS

- a. The researcher should consider each of the objectives and conclude the findings in view of the objective.
- b. Attempts must be made to show through the conclusions that the set objectives have been accomplished.
- c. All conclusions must be put forward in view of the objectives of the research. If some objective is not fully accomplished due to lack of data, it should be explained clearly, rather than disguising that.

12. RECOMMENDATIONS

1. There must be a support from the results of the study for making recommendations.
2. The resources of the company to which recommendations are being made must be kept in mind.
3. It should not be a very expensive proposition which the company cannot implement owing to lack of funds.
4. In nutshell, the recommendations must be such that it could be implemented.

13. SUMMARY (ABSTRACT)

- a. A brief summary of the report may be given at the end of the research report.
- b. The scope for further research must also be highlighted in this section.
- c. An abstract is a brief of the research which can also be given in the beginning of the presentation.

14. APPENDICES

- a. The information which are not directly related to the main body of the research report should be included in the appendices for those readers who want to go in-depth of certain aspects of the research work.
- b. It contains a detailed statement on the sample design, formulae used to determine the sample size, detailed statistical tables, the questionnaire, the detailed instructions for the interviewer and respondents, etc.

15. BIBLIOGRAPHY

Bibliography must be given at the end of the research work.

Some researchers include bibliography in the appendices. But, it is wrong and should be given at the end of the research work. Some references given in the bibliography might not be used in the research work. But, they are given for the purpose of the future researchers' so that these can also be consulted, if the need be. Because of this reason, the bibliography must be relegated to the end of the research work.

A comprehensive layout of the research report should consist of following

1. Preliminary Section: The preliminary section usually consists of following pages

a) Title pages: Name of the topic and title of the study should be given. The title should be in the CAPITAL LETTERS. If the title exceeds one or more lines, the double space to be provided and place it in an inverted pyramid style.

Ex: A STUDY ON WORKINGS OF PRIMARY AGRICULTURAL
CO-OPERATIVE CREDIT SOCIETY IN SALEM

There are no terminal punctuations at the end of the title. The items mentioned in the title are centered in the margin. The title of the study should be simple and concise. It should be printed on the board cover page and another should be printed in "Japan art Paper" Degree for which report is submitted should be mentioned as follows.

The dissertation/thesis submitted for the award of M.Com (C.A.) to Vysya College, Salem

(affiliated to Periyar University)

Full name of candidate with his previous academic background and name of faculty member who guide should be specified.

The emblem of the institution should be affixed.

Name of institutions to which the report is submitted, month and year of submission should also be specified.

b) Approval sheet Department or College approval sheet should be attached. In this sheet necessary space to be provided for the signature of supervisor or guide of dissertation.

c) Acknowledgements: It is page for acknowledging the guide and assistances received during the course of the researcher's study. It should convey indebtedness for the academic and administrative assistance received by him. It should be expressed in simple language. Other language received from library type writing institute, computer center etc., to be expressed clearly.

d) Table of contents: It gives the readers' a bird eye view of the report and to locate the report quickly. It includes the chapter headings, sub-heading of chapter. The chapter titles are typed with capital letters with proper pagination.

e) List of tables: The list of tables and figures should be given in a separate page. The full title of table and figures should be given.

2. Body of the report:

After the prefatory items, the body of the report is presented. The body of the report will consist of several chapters.

a) Introduction: This is the first chapter in the body of a research report. It consists of introduction of the theoretical background of the problem, its definition and formulation.

b) The statement of the problem: In this section why and how the problem was selected are stated. The problem is clearly defined and its facets and significance are pointed out. A breakdown of the problem and its constituent elements, major subdivisions are given.

c) Review of literature: It is meant for making brief review of previous studies on the problem and significant writings on the topic under study.

d) Objectives of the study: The objectives of the study and the investigative questions relating to each of the objectives are presented.

e) Hypothesis: The specific hypothesis to be tested is stated. The sources of their formulation may be indicated.

f) Definition of the concepts: The operational definition of the key concepts and variables of the study are presented, giving justifications for the definitions adopted.

g) Design of the study: In this part overall methodology of data collection, sample design, data collection instruments, methods of data processing and plan of analysis is given.

1. Sources of data: The sources from which the secondary and primary data were gathered are stated.

2. Sampling plan: The size of the universe from which the sample was drawn, the sampling methods adopted and the sample size and the process of sampling are described in this section.

3. Statistical design: In this section researcher gives the statistical tools that he is going to use for analyzing the data.

h) Instrument for data collection : The types of instruments used for data collection and their contents,

Scales and other devices used for measuring variables and the procedure of establishing their validity and reliability are described.

i) Limitations of the study: Here, the researcher should state the limitations of the data used, analyses

Applied, validity of conclusions etc.

3. Results, Findings and Discussions:

This is the major part of the research. It may be divided into several chapters depending upon the number of the objectives of the study. The chapters should be well-balanced, mutually related and arranged in logical sequence. Each chapter should be given appropriate heading.

Each aspect of the chapter may be dealt with under an appropriate paragraph heading in the

following manner.

- a) A brief description of the theory pertaining to the chapter.
- b) A citation of the relevant findings of previous studies.
- c) A presentation of summary table relating to the subject matter.
- d) Presentation of the findings and the inference drawn from it.

Each table and chart should contain the self-explanatory unit within the body of the report and presentation should be clear.

4. Summary conclusions and Recommendations:

This is the last chapter in the body of the research report. This is a summary of the whole report, containing a summary of essential background information, findings and conclusions and recommendations. Brief statement of the problem, purpose of the study and methodology used in the investigation, findings and conclusions are presented. The results of analyses along with their conclusions should be presented in the same order in which they were discussed in the previous chapters. The researcher should give suggestions for overcoming the problems identified in the course of the study.

5. Terminal Items:

- a) Bibliography: It is the first terminal items presented at the end of the research report. Bibliography may refer to all the documents which have bearing on the dissertation/thesis, irrespective of their being actually referred to or not, in the text.
- b) Appendix : The following documents are included in appendix :
 1. copies of data collection instruments
 2. technical details of sampling plan
 3. complex primary tables
 4. statistical computations
 5. supporting documents

A glossary of new terms used in the report furnished under appendix

- c) Index: Index is an alphabetical listing of names, places, and topics along with the numbers of the pages in a book or report on which are mentioned. They should be given at the end of the report.

Contents of Table:

The purpose of table of contents is to provide an outline of the content of the report. If logical and appropriate topical headings are used in the report, the table of contents presenting them becomes helpful to a reader. The table of contents appears after the preface/acknowledgements.

It may contain only a list of titles of chapters and their appropriate Roman numerals, followed by page number on which each chapter begins or it may be more analytical, containing besides the chapter titles, subheads or section headings or words or phrases indicating the subject matter of the chapters. Subtitles, however, should be indented under each chapter title and be followed by the specific page or section references. If reference to specific pages for subtitles is not desired, the subtitles may be run together and separated by semicolons or dashes when so many sub-headings exist. It may give an overcrowded look if all these are indicated in the table of contents. Hence, these may be placed at the beginning of that particular chapter below the title and the number of the chapter.

The table of content should also include the acknowledgements/preface; list of table's figures etc., the first page is not referred in the table of contents because it is always the title page. Similarly, the table of contents page is also not referred in the table of contents.

While typing a dissertation/thesis, the table of contents is typed last. The heading "TABLE OF CONTENTS" should be in the centre at the top of the page and in capital letters.

On the right hand should be typed the heading "page" at the right margin, below which page numbers will appear. On the left hand will appear the headings in the sequence in which they actually appear in the dissertation/thesis. Main headings should be in capital letters without closing punctuation i.e., full stop and should be numbered consecutively. Sub headings are intended two spaces under the concerned main heading. Small letters should be used for the subheadings except for the first initial letter and of all nouns, pronouns, adjectives, adverbs and verbs.

Bibliography: A bibliography means booklist i.e., a list of written sources, either published or unpublished, consulted in the preparation of the report during the course of research, Books,

periodical articles, government documents, unpublished materials, pamphlets, films, radio or television broadcasts, records, lectures, interviews, etc.,

Bibliography may refer to all the documents which have bearing on the dissertation/thesis, irrespective of their being actually referred to or not, in the text. The aim is to permit the reader to find the exact item you consulted.

Kind of bibliography:

- a) References of Literature cited comprises a list of documents which is confined only to those works actually cited in the text of the footnotes of the report.
- b) Sources consulted consist of a comprehensive listing of books and papers consulted including those which are not strictly relevant to the subject of the thesis.
- c) Selected bibliography contains those sources cited together with the more relevant of the works which have been consulted.
- d) Bibliographical notes is a brief annotated bibliography where the references are combined with the bibliography list. A typical Bibliography notes system will bear consecutive Arabic numerals. These might be divided and numbered in separate series according to the respective chapters to which they belong.

Format : The formats for bibliographical listing for books, reports, articles etc. are same as the formats for footnotes except one difference. That is, no page number is stated in the case of books and reports listed in the bibliography.

Another difference is often indicated: While in the first footnote relating to a work, author's name begins with the first name (e.g., Peter F, Drucker) in the bibliography, name begins with the second or the surname (e.g., Drucker, Peter F). As the information required for the foot notes and the bibliography is secured from the same source, viz., source cards, the author-surname format may be used in both cases, as explained earlier.

Classification: References may be grouped according to their form of publications; for examples, books may be listed in one group; periodicals in a second group, and reports in another group. In each group references should be arranged in alphabetical order of the surnames of authors or by initial letter of the first words of listing.

A bibliography containing less than twenty titles need not be subdivided into categories.

When there are two or more works by the same author repetition of his name is avoided by substituting for it an unbroken line eight spaces in length, beginning with the left margin, e.g.,

Ggod Carter V.ed., Dictionary of Education, New York: McGraw Hill, 1973.

- Essentials of Educational Research, New York: Appleton – Century – Crofts, 1966. and Douglas E.Scates, Method of Research, New York: Appleton Century – Crofts, 1954.

Some Examples of Bibliographical Forms:

A. Books: Brislin, R.W. earl., Cross – cultural Research Methods, New York: John Wiley & Sons, 1973.

B. Journals: Becker, H.S. and Geer, B., “Participant Observation and Interviewing”, Human Organization, 16, 1957, pp.28-32

C. Report: UNCTAD, The Least Developed Countries: 1984 Report, New York: United Nations, 1984.

Annotated Bibliography: In this Bibliography, each entry is followed by a one-sentence or one paragraph description of the content of the work cited.

Appendices: An appendix or appendices is used for additional or supplementary materials which has not found place in the main text. Here following items should be included.

1. complex or master tables
2. original data schedules questionnaires and interview forms,
3. copies of cover letters used in the study,
4. documents and long explanatory notes to the text,
5. Instructions to field workers,
6. statistical tests and any
7. The material evidence of considerable reference value.

Thus, such of those materials given in appendices are not directly essential to an understanding of the text but useful as supporting evidence only.

Appendices may be placed between the final chapter and the bibliography or immediately after the bibliography; it is largely left to the discretion of the writer. All appendices should be separated and listed accordingly in the Table of Contents together with page numbers. Each appendix should be referred to in the body of the thesis. This may be done by reference to in the next itself or by footnote and should occur at the earliest point in the thesis where the material appended is pertinent to the discussion/reference.

The appendix is preceded by a sheet containing the APPENDIX capitalized at centre of the page. Each appendix should have a suitable caption. If more than one appendix is necessary or if the appendices are divided into sections, each part should be designated by a capital letter. e.g., APPENDIX – A, APPENDIX – B, etc., rather than a number. Pages are numbered serially using Arabic numerals.

Footnotes: Footnotes are called footnotes because they are traditionally placed at the foot of the page. Modern writers/printers, for their own convenience, have introduced the practice of collecting them at the end of a book or chapter.

Details in Footnotes: As a rule, each footnote gives one reference. The following (sources of) information is usually included in footnotes:

1. The name of the author,
2. Title of the source,
3. Place of publication,
4. Publisher's name,
5. Date of publication,
6. Exact page(s) of the source of reference,
7. Explanatory note for concepts, definitions, incidental comparison or contrary view, if any.

Purposes of Footnotes: Footnotes serve the same purpose as appendices or bibliography. Footnotes are mostly used for the following purposes:

1. To indicate the source of information (including a non-bibliographical source), on the subject/point under discussion.
2. To acknowledge facts and ideas borrowed i.e., to carry out a tradition of honour among scholars by acknowledging or giving credit to previous/original authors who have tackled the problem or expressed the view.
3. To guide the reader with sufficient information to enable him to consult sources, independently for more details.
4. To provide legal protection to publish substance or words from another writer (such publication unacknowledged might justify a legal suit for plagiarism)
5. To distinguish the researcher's contribution from those of others/scholars.
6. To explain, supplement or amplify material that is included in the main body or the text or to illustrate statements relevant not important enough to be included in the text.

Form of Foot notes: Here are the four most common forms of the acknowledgement footnote:

1. V.S. Aggarwal, A guide to Company Deposits, (Delhi: National Publishing House, 1983) p.132.
2. L.C. Gupta, Banking and working capital Finance Selected Papers (Delhi: The Macmillan Company of India Ltd., 1978)
3. George Rosen, "Bank Policies and Finance to Industry" Readings in Industrial Finance, ed. L.C. Gupta (Delhi: The Macmillan Company of India Ltd., 1976), p.154
4. M.P. Bansal, "Cost components of Public Deposits: A contemporary Approach", The Chartered Accountant, April, 1984, p.639.

DISTINGUISH BETWEEN BIBLIOGRAPHY AND FOOTNOTE.

	Bibliography	Footnote
Name Order	Last name first (of first author when more than one authors)	First name first.
Placement	End of body of report listed alphabetically by last name of first author.	Bottom of page with superscript.
Punctuation	Author name, Title, Place of publication, Publisher, date of publication	Author, Title (Place of publication;

Page references	414 pp. (total number of pages in book or in article)	Publisher date of publication). p.23 (specific page location of reference).
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EXPLAIN VARIOUS STEPS INVOLVED IN DRAFTING A RESEARCH REPORT.

Research report considered a major component of research. Even though it is prepared with most brilliant, advanced hypothesis tools, highly well defined & designed research study & the most striking generation finding are of little value unless they are effectively communicated to other.

The purpose of research doesn't well serve unless the finding is made known to others. Report writing is an integral part of the research work. This task should be done with at most care and the researcher can seek the assistance & guidance of the experts.

Following are the steps in writing a research report:-

Research reports are the product of slow, painstaking, accurate inductive work. The usual steps involved in writing report are:

- (a) Logical Analysis of the Subject Matters
- (b) Preparation of the Final Outline
- (c) Preparation of the Rough Draft
- (d) Rewriting and Polishing
- (e) Preparation of the Final Bibliography
- (f) Writing the Final Draft

Though all these steps are self explanatory, yet a brief mention of each one of these will be appropriate for better understanding.

1. Logical Analysis of Subject of Matter: The first step is to develop the in subject matter. There are two ways in which subject matter can be developed. (1) Logically (2) Chronological order

- Logically – Logical is made on the basis of mental connections & associations between one thing and another by means of analysis. Logical treatment often consists in developing materials from the simple possible and to the most complex structure.
- Chronological – It is based on a connection or sequence in a time & occurrence. The direction for during making something usually follows a chronological order.

2. Preparation of the Final Outline: It is the frame work upon which the long written works are constructed. The outlines are aimed at logical organization of materials and remainders of the points stored in the report.

3. Preparations of Rough Draft: The researcher has to sit and write down, what he has done in the on text of his research work or study. He has to present the matters pertaining to collection of various materials for his study along with various limitations faced by him. The broad finding & generalization of various suggestions concerning the plan may also be stated.

4. Rewriting & Polishing the Rough Draft: It is a difficult task, which require more time. The careful revision makes the different between the mediocre & good piece writing. While rewriting & polishing research report, the researcher may check the weakness, illogical sequence, & poor presentations. The researcher should ensure the matters presented n cosines exhibit a definite pattern & standard form. He should check up the mechanism of writing, grammar, spelling & usage. The matters should be presented systematically and evoke the interest of reader. There should be consistency in presentations of idea.

5. Preparation of Bibliography: Bibliography is generally appended to the research report. It is list of books which are pertinent for the research are attached. The bibliography should be arranged alphabetically & divided into two parts, (1) Books & (2) Magazines.

Books: It should be stated as per the following order. Name of the author, Title of book referred, Publication

- Place of publication, Year
Kothari C.R. quantitative techniques New Delhi, Vikas publishing house Pvt., Ltd, 2nd editing 1978.

Magazines: Name of the author, Title of author in quotations, Name of the periodicals, Volume no

1, Page notions. Ex., Robert V. Roosa, "Copying with short of term international money flows" The banker vol 8 Sept., 1991, p.95.

6. Writing the Final Draft: Final draft should be written in concise objective styles, simple language. Research report should avoid vague expression such as "it seems to be" "we" "these" "there may be" "he" "I" "She" & like. The researcher must avoid abstract terminology and technological jargons. It should be intellectual and contribute to solve the solution for a problem and must add knowledge both to the researcher and to the reader. The hard work in writing the research report makes the interest of the reader. Styles in writing report.

1. Keep the sentences as short as possible.
2. Prepared to use simple sentences instead of complex sentences.
3. Try to use familiar words.
4. Avoid unnecessary words.

A research report should not be dull, but must enthuse people and maintain interest and must show originality

Every report should be an attempt to solve some intellectual problem and must contribute to the solution of a problem and must add to the knowledge of both the researcher and the reader

WRITE THE MECHANICS OF WRITING A RESEARCH REPORT.

There are very definite and set rules which should be followed in the actual preparation of the research report or paper. Once the techniques are finally decided, they should be scrupulously adhered to, and no deviation permitted. The criteria of format should be decided as soon as the materials for the research paper have been assembled. The following points deserve mention so far as the mechanics of writing a report are concerned:

Size and physical design: The manuscript should be written on unruled paper 8 ½" x 11" in size. If it is to be written by hand, then black or blue-black ink should be used. A margin of at least one and one-half inches should be allowed at the left hand and of at least half an inch at the right hand of the paper. There should also be one-inch margins, top and bottom. The paper should be neat and legible. If the manuscript is to be typed, then all typing should be double-spaced on one side of the page only except for the insertion of the long quotations.

1. Procedure: Various steps in writing the report should be strictly adhered (All such steps have already been explained earlier in this chapter).

3. Layout: Keeping in view the objective and nature of the problem, the layout of the report should be thought of and decided and accordingly adopted (The layout of the research report and various types of reports have been described in this chapter earlier which should be taken as a guide for report-writing in case of a particular problem).

4. Treatment of quotations: Quotations should be placed in quotation marks and double spaced, forming an immediate part of the text. But if a quotation is of a considerable length (more than four or five type written lines) then it should be single-spaced and indented at least half an inch to the right of the normal text margin.

5. The footnotes: Regarding footnotes one should keep in view the followings:

- (a) The footnotes serve two purposes viz., the identification of materials used in quotations in the report and the notice of materials not immediately necessary to the body of the research text but still of supplemental value. In other words, footnotes are meant for cross references, citation of authorities and sources, acknowledgement and elucidation or explanation of a point of view. It should always be kept in view that footnote is not an end or a means of the display of scholarship. The modern tendency is to make the minimum use of footnotes for scholarship does not need to be displayed.
- (b) Footnotes are placed at the bottom of the page on which the reference or quotation which they identify or supplement ends. Footnotes are customarily separated from the textual material by a space of half an inch and a line about one and a half inches long.
- (c) Footnotes should be numbered consecutively, usually beginning with 1 in each chapter separately. The number should be put slightly above the line, say at the end of a quotation. At the foot of the page, again, the footnote number should be indented and typed a little above the

line. Thus, consecutive numbers must be used to correlate the reference in the text with its corresponding note at the bottom of the page, except in case of statistical tables and other numerical material, where symbols such as the asterisk (*) or the like one may be used to prevent confusion.

- (d) Footnotes are always typed in single space though they are divided from one another by double space.

6. Documentation style: Regarding documentation, the first footnote reference to any given work should be complete in its documentation, giving all the essential facts about the edition used. Such documentary footnotes follow a general sequence. The common order may be described as under:

(i) **Regarding the single-volume reference:** Author's name in normal order (and not beginning with the last name as in a bibliography) followed by a comma;

1. Title of work, underlined to indicate italics;
2. Place and date of publication;
3. Pagination references;

7. **Punctuation and abbreviations in footnotes:** The first item after the number in the footnote is the author's name, given in the normal signature order. This is followed by a comma. After the comma, the title of the book is given: the article (such as "A", "An", "The" etc.) is omitted and only the first word and proper nouns and adjectives are capitalized. The title is followed by a comma. Information concerning the edition is given next. This entry is followed by a comma. The place of publication is then stated; it may be mentioned in an abbreviated form, if the place happens to be a famous one such as Lond. for London, N.Y. for New York, N.D. for New Delhi and so on. This entry is followed by a comma. Then the name of the publisher is mentioned and this entry is closed by a comma. It is followed by the date of publication if the date is given on the title page.

8. **Use of statistics charts and graphs:** A judicious use of statistics in research report is often considered a virtue for it contributes a great deal towards the clarification and simplification of the material and research results. One may well remember that a good picture is often worth more than a thousand words. Statistics are usually presented in the form of tables, charts, bars and line-graphs and pictograms. Such presentation should be self explanatory and complete in itself. It should be suitable and appropriate looking to the problem at hand. Finally, statistical presentation should be neat and attractive.

9. The final draft: Revising and rewriting the rough draft of the report should be done with great care before writing the final draft. For the purpose, the researcher should put to himself questions like: Are the sentences written in the report clear? Are they grammatically correct? Do they say what is meant? Do the various points incorporated in the report fit together logically? "Having at least one colleague read the report just before the final revision is extremely helpful. Sentences that seem crystal-clear to the writer may prove quite confusing to other people; a connection that had seemed self evident may strike others as a *non-sequitur*. A friendly critic, by pointing out passages that seem unclear or illogical, and perhaps suggesting ways of remedying the difficulties, can be an invaluable aid in achieving the goal of adequate communication."

10. Bibliography: Bibliography should be prepared and appended to the research report as discussed earlier.

11. Preparation of the index: At the end of the report, an index should invariably be given, the value of which lies in the fact that it acts as a good guide, to the reader. Index may be prepared both as subject index and as author index. The former gives the names of the subject-topics or concepts along with the number of pages on which they have appeared or discussed in the report, whereas the latter gives the similar information regarding the names of authors. The index should always be arranged alphabetically. Some people prefer to prepare only one index

common for names of authors, subject-topics, concepts and the like ones.

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