

BUSINESS RESEARCH METHODS

MODULE



DEPARTMENT OF MANAGEMENT COLLEGE OF BUSINESS AND ECONOMICS ARBA MINCH UNIVERSITY

COLLEGE OF CONTINUING AND DISTANCE EDUCATION

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CHAPTER ONE

Research Methods

An Introduction

Curiosity or questioning is a distinguishing aspect of human beings. As human beings, we may have questions in our mind about business or economic, social, political, environmental, and many other areas of activities. Whenever we encounter problems about these and other areas of concern, we try to find solutions to them. A systematic search for such solutions to problems involves research.

Managers in organizations constantly engage themselves in studying and analyzing issues and hence are involved in some form of research activity as they make decisions at the workplace. As is well known, sometimes managers make good decisions and the problem gets solved, sometimes they make poor decisions and the problem persists, and on occasions they make such colossal blunders that the organization gets stuck in the mire.

The difference between making good decisions and committing blunders lies in how managers go about the decision-making process. In other words, good decision-making fetches a “yes” answer to the following questions.

- Do managers identify where exactly the problem lies,
- Do they correctly recognize the relevant factors in the situation needing investigation?
- Do they know how to make use of information so collected and draw appropriate conclusions to make the right decision, and finally,
- Do they know how to implement the results of this process to solve the problem? This is what this reading material is all about.

Business research is an organized, systematic, data based, critical, objective, scientific enquiry or investigation into a specific problem undertaken with the purpose of finding answers or solutions to it in essence, research provides the needed information that guides managers to make informed decisions to successfully deal with problems.

Hence, **Dear learner!**, in this chapter, you will learn introductory issues in research: what research is, characteristics of Research, objectives of Research, motivation in Research, classification of Research, research approaches, and finally Research Process will be highlighted. After completing this course students will be able to understand:

- 1.1. Meanings of Research
- 1.2. Types of Research
- 1.3. Motivation of doing Research
- 1.4. Research and Scientific Method
- 1.5. Research Process
- 1.6. Criteria of Good Research

1.1 Meaning of Research

Research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions; and last carefully testing the conclusions to determine whether they fit the formulated hypothesis.

The Advanced Learner's Dictionary of current English lays down the meaning of research as a careful investigation or inquiry especially through search for new facts in any branch of knowledge.

The word research is composed of two syllables, re and search. RE=Is a prefix meaning again, anew or over again and SEARCH =Is a verb meaning to examine closely and carefully, to test and try or to probe. Together they form a noun describing a careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles.

Research is a systematic, controlled empirical and critical method consisting of enumerating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solutions toward the concerned problem or in certain generalizations for some theoretical formulation.

1.2 Types of research

There are different bases in classifying researches; however, we will see only the most common bases

1. First, there are two broad classification of research that follows:

- a. Research in physical sciences
- b. Research in social sciences

Physical sciences deal with things, which can be put to laboratory tests under guided conditions. These researches deal with physical phenomena upon which man has complete control.

Researches in social sciences are based on human behavior, which is influenced by so many factors, such as physical, social, temperamental, psychological and economic.

2. Research can also be classified from other three perspectives. However, these perspectives are not mutually exclusive.

- A. The application of the research study
- b. The objectives in undertaking the research; and
- c. The type of information sought.

1. Classification of research based on Application of the research study

From this perspective, there are two broad categories of researches: pure research and applied research.

a. **Pure research** involves developing and testing theories and hypothesis that are intellectually challenging to the researcher but may or may not have practical application at the present time or in the future.

The knowledge produced through pure research is sought in order to add to the existing body of knowledge of any branch of knowledge.

b. **Applied researches** are conducted to solve the practical problems or concerns such as for policy formulation, administration, and the enhancement of understanding of a phenomenon.

2. **Classification of researches based on Objectives of the**

study a. Descriptive Research

Its major purpose is description of the state of affairs as it exists at present. In social science and business research it is often called exposit fact research. Most of the researches in the social sciences are applied researches. Researcher has no control over the variables, he can only report what has happened or what is happening. It also includes attempts by researchers to discover causes even when they cannot control the variables.

b. Correlational Research

Its main emphasis is to discover or establish the existence of a relationship/association/interdependence between two or more aspects of a situation.

Examples

- What is the impact of an advertising campaign on the sale of a product?
- What is the relationship between stressful living and the incidence of heart attacks?
- What is the relationship between technology and employment?
- What is the effect of home environment on educational

achievement? c. **Explanatory Research**

It attempts to clarify why and how there is a relationship between two aspects of a situation or phenomenon. This type of research attempts to explain, for example, why stressful living results in heart attacks; or how the home environment affects children's level of academic achievement.

d. Exploratory Research

Is carried out to investigate the possibilities of undertaking a particular research study.

Is also called a 'feasibility study' or a 'pilot study'. It is usually carried out when a researcher wants to explore areas about which s/he has little or no knowledge. Exploratory studies are also conducted to develop, refine and/or test measurement tools and procedures.

3. Classification of researches based on the type of information Sought

a. **Quantitative Research:** Is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity.

b. **Qualitative Research:** Is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. It is especially important in behavioral sciences where the aim is to discover the underlying motives of human behavior.

1.3. Motivation in Research

Why people take themselves to research is the main question. The possible motives may be either one or more of the following:

- 1) Desire to get a research degree along with its consequential benefits;
- 2) Desire to face the challenges in solving the unsolved problems;
- 3) Desire to get intellectual joy of doing creative work;
- 4) Desire to be of service to the society
- 5) Desire to get respectability

The motivation will, however, determine to a considerable extent the nature, quality, depth and duration of research.

1.4. Research and scientific Methods

The two terms research and scientific methods are closely related.

Research, as already stated, can be termed as an inquiry in to the nature of , the reasons for, and the consequences of any particular set of circumstances, whether these circumstances are experimentally controlled or recorded just as they occur. On the other hand, the philosophy common to all research methods and techniques, although they may vary considerably from one science to another, is usually given the name of scientific method.

1.5. The Research processes

Before embarking on the details of research methodology and techniques, it is appropriate to present a brief over view of the research process. Research process consists of series of actions or steps necessary to effectively carry out research and the desired sequencing of these steps. A research process consists of a number of closely related activities. The activities overlap continuously rather than following a strictly prescribed sequence. However, the following order provides a useful procedural guideline regarding the research process.

1. Formulating the Research Problem

Formulating a research problem is the first and most important step in the research process. Formulation of the problem means defining the problem precisely. Formulation of problem is essential because when the problem is formulated, an appropriate technique can easily be applied to generate alternative solutions. In other words, a problem defined is half solved.

Formulation of a problem involves the following steps:

- a. Statement of the problem in a general way
- b. Understanding the nature of the problem
- c. Surveying the available literature
- d. Developing the idea through discussion
- e. Rephrasing the research problem into a working proposition.

2. Extensive Literature Review

Once the problem is formulated, a brief summary of it should be written down.

Literature review has three functions:

- a. Bringing clarity and focus to the research problem
- b. Improving the methodology
- c. Broadening the researcher knowledge in the research area.

3. Development of Working Hypothesis

After extensive literature survey, researcher should state in clear terms the working hypothesis. Working hypotheses is tentative assumption made in order to draw out and test its logical or empirical consequences. Hypotheses should be very specific and limited to the piece of research in hand because it has to be tested.

The role of hypotheses is to guide the researcher by delineating the area of research and keep him on the right track. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data and the type of methods of data analysis to be used.

4. Preparing the Research Design

Research design is defined as a blueprint or detailed plan for how a research study is to be completed, operationalizing variables so they can be measured, selecting a sample of interest to study, collecting data to be used as a basis for testing hypothesis and analyzing the results. It is the complete scheme or program of the research.

A research design should include the following:

- a. The study design per se
- b. The logistical arrangements that you purpose to undertake
- c. The measurement procedures
- d. The sampling strategy
- e. The frame of analysis
- f. Time frame

5. Determining Sampling Design

All the items under consideration in any field of inquiry constitute a universe or population.

A complete enumeration of all the items in the population is known as a census inquiry.

Because of the difficulty, relative inaccuracy and biasness related to census study determining sample, few elements from the population, becomes mandatory. In such cases, 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. Samples can be either probability samples or non-probability samples. With probability samples each element has unknown probability of being included in the sample but in the non-probability samples do not allow the researcher to determine this probability. Probability samplings 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??.

6. Collecting the data

There 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. Primary data can be collected either through experiments or through survey.

In the case of a survey, data can be collected by any one of the following specific ways:

- | | |
|----------------|------------------|
| a. Observation | c. Questionnaire |
| b. Interview | d. Schedule |

7. Execution of the project

The researcher should see, during this phase that the project is executed in a systematic manner and in time.

8. Analysis of Data

The analysis of data requires a number of closely related operations such as:

- a. Establishment of categories,
- b. Coding,
- c. Tabulation and
- d. Drawing statistical inferences.

9. Hypothesis Testing

After analyzing the data, the researcher is in a position to test the hypothesis, if any, he/she had formulated earlier. Do the facts support the hypotheses or they happen to be contrary? Various tests, such as Chi square test, t-test, F-test may be applied.

10. Generalization and Interpretation

If a hypothesis is tested and accepted, it may be possible for the researcher to arrive at generalization, i.e., to build a theory. If the researcher had no hypotheses to start with, s/he might seek to explain his findings on the basis of some theory.

11. Preparation of the Research Report

Finally, the researcher has to prepare the report of what has been done by him following the appropriate formats and appropriate language.

1.6. Characteristics of (Good) Research

It is clear that research is a process for collecting, analyzing and interpreting information to answer questions. But to qualify as a research, a process must have certain characteristics as listed below:

- a. **Controlled:** In exploring the causality relation to two variables, the study must be set in way that minimizes the effects of other factors affecting relationship. In social science research, however, since controlling is almost impossible, the effect of the other variable must be quantified rather.
- b. **Rigorous:** One must be very careful (scrupulous) in ensuring that the procedures followed to find answers to questions are relevant, appropriate and justified.
- c. **Valid and verifiable:** This concept implies that whatever you conclude on the basis of your findings is correct and can be verified by you and others.
- d. **Empirical:** This means that any conclusions drawn are based upon hard evidence gathered from information collected from real life experiences or observations.
- e. **Critical:** The methods employed and procedures used should be critically scrutinized. The process of investigation must be foolproof and free from any drawbacks. The process adopted and the procedures used must be able to withstand critical scrutiny.

Chapter Summary

From among many ways of obtaining information to find answers to your questions, research is a systematic way. Research can broadly be categorized as research in physical or natural sciences and research in human or social sciences. While social science researches study about social phenomenon, natural science researches deal with things which can be put for laboratory tests under guided conditions. Descriptive, correlational, explanatory, exploratory can be also another category of research. still A research applies two approaches: *quantitative approach and qualitative approach*. Quantitative approach to research generates data in quantitative form which is subject to quantitative analysis.

Since various activities in a research process overlap, the number of steps in a research process varies according to different authors. In this module, you learned an eleven-step process the details of which are found in the succeeding chapters. These steps cover the total spectrum of research endeavor, starting from problem formulation and ending with writing-up of a research report.

To qualify as a research, a process must have certain characteristics such as Controlled, Rigorous, Valid and verifiable, Empirical and Critical

Chapter review questions**Choose the best answer from the alternatives**

1. ABC Company currently facing declining demand for its products as a result profitability is decreasing. Mr. Girma is a manager of the company and wants to know why and how there is a relationship between demand and profitability. What type of research the manager wants to do?
A. Descriptive Research
B. Correlational Research
C. Exploratory Research
D. Explanatory Research
E. None
2. _____ is the characteristics of good research which means any conclusions drawn are based upon hard evidence gathered from information collected from real life experiences or observations.
A. Empirical
B. Controlled
C. Rigorous
D. Critical
E. None
3. One of the following factors can not motivate an individual to a research
A. The motive to face the challenges in solving the unsolved problems;
B. The motive to get intellectual joy of doing creative work;
C. The motive to be of service to the society
D. The motive to get respectability
E. None
4. The quantitative research strategy places a value on:
A. Using numbers, measurements and statistical techniques
B. Fact relating to or involving quality or kind
C. Usually employing open-ended interviews, observations, document analysis, life stories, and such other means
D. All of the above
5. Assume that Mr. Desho is conducting a research entitled on “ **The effect of career development on employee turnover**” with particular reference to Arbaminch university”. What type of research he is conducting?
A. Descriptive Research
B. Correlational Research
C. Exploratory Research
D. Explanatory Research
E. None

CHAPTER TWO

Defining Research Problem and Hypothesis Formulation

Introduction

Dear learner! From the previous chapter, you remember that formulation of a research problem is the first step in a scientific inquiry. It is like the identification of a destination before undertaking a journey. As in the absence of destination it is impossible to identify any route, in the absence of clear research problem, it is impossible to have clear and economical plan. A researcher must find the problem and formulate it so that it becomes susceptible to research. A researcher must examine all the symptoms (presented to him or observed by him) concerning a problem before he can diagnose correctly. To define a problem correctly, a researcher must know what a problem is. A research problem is like the foundation of a building. A research problem serves as the foundation a research study: if it is well-formulated, you can expect a good study to follow. Accordingly, in this chapter, issues such as research problem and sources, criteria of a good research problem, problem formulation /definition and the need of definition, necessary conditions and techniques for formulation of research problem, and related issues like operational definition of concepts, and variables and their classifications, research hypothesis and sources, types of hypothesis, rules of constructing hypothesis, forms of stating hypothesis, characteristics of a good hypothesis, and difficulties in the formulation of hypothesis will be discussed.

Chapter outlines

- 2.1 What is a research problem?
- 2.2 Components of research problem
- 2.3 Problem formulation and research question
- 2.4 What is hypothesis?
- 2.5 Importance of hypothesis
- 2.6 Criteria for hypothesis formulation

2.1 What is a research problem?

A research problem refers to some difficulty, which a researcher experiences in the context of either a theoretical or practical situation and wants to obtain a solution for the same. One of the most difficult phases of any research project is the choice of a suitable problem. The beginner is likely to take a very long time in making his choice. In this first step of any research, the research worker should not take a hasty decision. Every problem which comes to his/her mind or even the one suggested by a more experienced person may not fit research problem. The identification of a good research problem should be considered a discovery in itself.

2.1.1 selecting the problem

The identification of a research problem is an important phase of the entire research process. Therefore, a considerable care must be taken while selecting a research problem. It requires a great deal of time, energy, and logical thinking.

There are some important sources which are helpful to a researcher for selecting a problem. These include the following:

1. **Professional Experience:** The day-to-day observation of the incidences in the working places and out of the working places.
2. **Contact and Discussion with People:** Contacts and discussions with research-oriented people in conferences, seminars or public lectures serve as important sources of problem.
3. **Inference from Theory:** A research problem can be derived from a critical look into various theories
4. **Professional Literature:** Consultation of research reports, bibliographies of books and articles, periodicals, research abstracts...
5. **Technological and social Change:** Changes in technology or social environment such as changes in attitudes, preferences, policies of a nation...

The following points may be observed by a researcher in selecting a research problem or a subject for research.

- A. Subject which is overdone should not be normally chosen, for it will be a difficult task to throw a new light in such a case
- B. Controversial subject should not be chosen
- C. Too narrow or too vague problem should be avoided
- D. The subject selected for research should be familiar and feasible so that the related research material or sources of research are within one's reach
- E. The importance of the subject, the qualifications of the researcher, co-operations from participants, the costs and time factors are the other factors should be considered.
- F. The selection of a problem must be preceded by a preliminary study.

2.2 Components of research problem

Often we say that a research problem does exist if the following conditions are met:

- a. There must be an individual or a group which has some difficulty or the problem.
- b. There must be some objective(s) to be attained. If one wants nothing, one cannot have a problem.
- c. There must be an alternative means (or the course of action) for obtaining the objective(s) one wishes to attain.
- d. There must remain some doubt in the mind of a researcher with regard to the selection of alternatives.
- e. There must be some environment(s) to which the difficulty pertains.

2.3 Problem formulation and research question

Formulation means translating and transforming the selected research problem /topic in to a scientifically researchable question. It is concerned with specifying exactly what the research problem is or why it is studied. It involves the task of laying down boundaries within which a researcher shall study the problem with a predetermined objective in view.

Moreover, problem definition implies the separation of the problem from the complex of difficulties and needs. It means to put a fence around it, to separate it by careful distinctions from like question found in related situations of need.

To define a problem means to specify it in detail and with precision. Each question and subordinate question to be answered is to be specified. Sometimes it is necessary to formulate the point of view on which the investigation is to be based. If certain assumptions are made, they are explicitly noted.

It is important to define and elucidate the problem as a whole and further define all the technical and unusual terms employed in the statement. By this, the research worker removes the chance of misinterpretation of any of these crucial terms. The definition helps to establish the frame of reference with which the researcher approaches the problem.

To define a problem means to put a fence round it, to separate it by careful distinctions from like questions found in related situations of need. Defining a problem involves the task of laying down boundaries within which a researcher shall study the problem.

formulating a research problem has the following **importance**

- a. It determines the research destiny. It indicates a way for the researcher. Without it a clear and economical plan is impossible.
- b. Research problem is like the foundation of a building. The research problem serves as the foundation of a research study: if it is well formulated, one can expect a good study to follow.
- c. The way you formulate your research problem determines almost every step that follows: i.e.
 - the type of study design that can be used;
 - the type of sampling strategy that can be employed;
 - the research instrument that can be used; and
 - the type of analysis that can be undertaken.
- D The quality of the research report (output of the research undertakings) is dependent on the quality of the problem formulation.

Formulation of a problem involves the following **steps/techniques** involved in defining a problem:

- a. Statement of the problem in a general way
- b. Understanding the nature of the problem
- c. Surveying the available literature
- d. Developing the idea through discussion
- e. Rephrasing the research problem into a working proposition.

In addition to what has been stated above, the following points must also be noted while defining a research problem:

- Technical terms and words or phrases should be clearly defined.
- Basic assumptions or postulates (if any) relating to the research problem should be clearly stated.
- A straight forward statement of the value of the investigation (i.e., the criteria for the selection of the problem) should be provided.
- The suitability of the time period and the sources of the data available must also be considered.
- The scope of the investigation or the limits within which the problem is to be studied must be mentioned explicitly.

2.4 Research Hypothesis

Introduction

The formulation of hypotheses or propositions as the possible answers to the research questions is an important step in the process of formulation of the research problem as explained in the previous section. Keen observation, creative thinking, hunch, wit, imagination, vision, insight and sound judgment are of great importance in setting up reasonable hypotheses. When the mind has before it a number of observed facts about some phenomenon, there is a need to form some generalization relative to the phenomenon concerned.

Having introduced this much, let us now see other aspects of a research hypothesis as follows.

1. The Meaning of Hypothesis

A hypothesis is alternatively defined in the following manner. A hypothesis is a statement temporarily accepted as true in the light of what is, at the time, known about a phenomenon, and it is employed as a basis for action in the search of new truth.

A hypothesis is a tentative assumption drawn from knowledge and theory which is used as a guide in the investigation of other facts and theories that are yet unknown. It is a guess, supposition or tentative inference as to the existence of some fact, condition or relationship relative to some phenomenon which serves to explain such facts as already are known to exist in a given area of research and to guide the search for new truth.

A hypothesis is a tentative supposition or provisional guess which seeks to explain the situation under observation. It states what we are looking for. A hypothesis looks forward. It is a proposition, which can be put to a test to determine its validity. It may prove to be correct or incorrect.

A hypothesis is a tentative generalization the validity of which remains to be seen. In its most elementary stage, the hypothesis may be any hunch, guess, imaginative idea which becomes the basis for further investigation. A hypothesis is an assumption or proposition whose tenability is to be tested on the basis of the compatibility of its implications with empirical evidence and with previous knowledge.

A hypothesis is, therefore, a shrewd and intelligent guess, a supposition, inference, hunch, provisional statement or tentative generalization as to the existence of some fact, condition or relationship relative to some phenomenon which serves to explain already known facts in a given area or research and to guide the research for new truth on the basis of empirical evidence. The hypothesis is put to test for its tenability and for determining its validity.

The testing of a hypothesis is the important characteristics of the scientific method. It is a prerequisite of any successful research, for it enables us to get rid of vague approaches and meaningless interpretations. It establishes the relationship of concept with theory, and specifies the test to be applied especially in the context of a meaningful value judgment. The hypothesis, therefore, plays a very pivotal role in the scientific research method.

The formulation of hypothesis, thus, is very crucial and the success or the failure of a research study depends upon how best it has been formulated by the researcher. We may conclude by saying that it is hard to conceive modern science in all its rigorous and disciplined fertility without the guiding power of hypothesis.

2. Hypothesis: Necessary or not?

Is the formulation of useful hypotheses always necessary and possible? Despite its importance, can hypotheses be set up in all cases? In a mere fact-finding investigation, no problems may be raised and the need for formulating hypotheses may not arise. Similarly, it may not be possible to set up a hypothesis in exploratory studies because the very purpose of this study may be to formulate a hypothesis. However, in all analytical and experimental studies, hypothesis should be set up in order to give a proper direction to them.

2.5 Importance of hypothesis

Hypothesis has very important place in research although it occupies a very small place in the body of a thesis. It is almost impossible for a research worker not to have one or more hypothesis before proceeding with his work. If he is not capable of formulating a hypothesis about his problem, he may not be ready to undertake the investigation. The

aimless collection of data is not likely to lead him anywhere. The importance of hypothesis can be more specifically stated as under:-

- A. It **provides direction to research**. It defines what is relevant and what is irrelevant. Thus it prevents the review of irrelevant literature and the collection of useless or excess data. It not only prevents wastage in the collection of data, but also ensures the collection of the data necessary to answer the question posed in the statement of the problem.
- B. It **sensitizes the investigator to certain aspects of situations**, which are relevant from the standpoint of the problem in hand. It spells the difference between precision and haphazardness, between fruitful and fruitless research
- C. It is **guide to the thinking process and the process of discovery**. It is the investigator's eye-a short of guiding light in the world of darkness
- D. It **focuses research**. Without it, research would be like a random and aimless wandering
- E. It prevents blind research. It also prevents indiscriminate gathering of data which may later turn out to be irrelevant
- F. It sensitizes the individual to facts and conditions that might otherwise be overlooked
- G. It places clear and specific goals before us. The clear and specific goals provide the investigator with a basis for selecting samples and research procedures to meet them
- H. It serves the function of linking together related facts and information and organizing them in to one comprehensible whole
- I. It enables the investigator to understand, with greater clarity, his/her problem and its ramification. It farther enables a researcher to clarify the procedures and methods to be used in solving his problem and to rule out methods which are incapable of providing the necessary data
- J. It serves as a framework for drawing conclusions. It makes possible the investigation of data in the light of tentative proposition or provisional guess. It provides the outline for setting conclusions in a meaningful way.

2.6 Criteria for hypothesis formulation

There are a number of considerations to keep in mind, as they are important, for valid verification, when constructing hypotheses.

- a. A hypothesis should be simple, specific, and conceptual clear.
- b. A hypothesis should be capable of verification.
- c. A hypothesis should be related to the body of knowledge.
- d. A hypothesis should be operationalizable. That is, it can be expressed in terms that can be measured. If it cannot be measured, it cannot be tested and hence no conclusions can be drawn

Moreover, a "good" hypothesis is the one which satisfies any of the following criteria.

i. Conceptual clarity: A hypothesis should be conceptually clear. It should consist of clearly defined and understandable concepts. This means that the concepts found in the hypothesis should be formally and operationally defined. *Formal definition or explication* of the concepts will clarify what a particular concept stands for, while the *operational definition* will leave no ambiguity about what would constitute the empirical evidence or indicator of the concept in the field. An ambiguous hypothesis characterized by undefined or ill-defined concepts cannot be tested since, understandably, there is no standards basis for knowing what observable facts would contribute to its test. It is advisable that the concepts embodied in the hypothesis be defined in a manner commonly accepted and combinable. This would ensure continuity in researches and go a long way in bringing about a cumulative growth of scientific knowledge.

ii. Specificity: A hypothesis should be specific and explain the relations between variables and the conditions under which these relations will hold. For example, “when there is dissatisfaction and no care is taken, deprivation will engender violence.”

Often the researchers are tempted to express their hypothesis in terms so general and with so grandiose a scope that they are simply not amenable to test. The temptation is *suicidal*. The researchers, therefore, would do all to avoid concepts in their hypothesis for which suitable tangible indexes have not been developed. A hypothesis would include a clear statement of indexes, which are to be used. For example, the concept of social class needs to be explicated in terms of indexes such as income, occupation, education, etc. Such specific formulations have the obvious advantage of assuring that research is practicable and significant. It also helps increase the validity of the results because the more specific the statement or predication, the smaller the probability that will actually be borne out as a result of mere accident or chance.

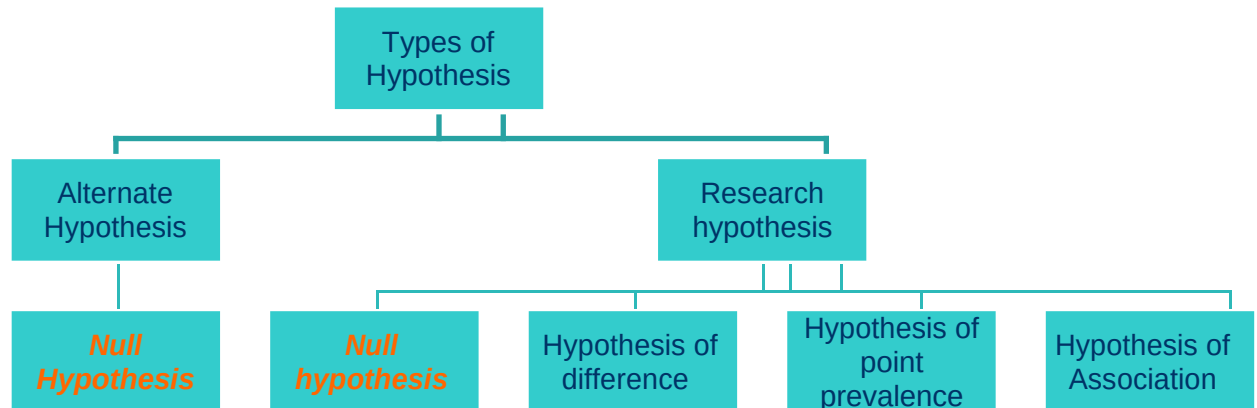
iii. Testability: A hypothesis should be testable and should not be a *moral judgment*.

It should be possible to collect *empirical evidences* to test the hypothesis. Statements like “Capitalists exploit their workers”, “Bad parents produce bad children” are common place generalizations and can not be tested, as they merely express sentiments and their concepts are vague.

iv. Availability of techniques: Hypothesis should be related to available techniques. Otherwise the research problems will not be researchable. The researcher who does not know that techniques are available to test his hypothesis is in a poor way to formulate usable questions. In other words, the hypothesis should be formulated only after due thought has been given to the methods and techniques that can be used to measure the concepts and variables incorporated in the hypothesis.

v. Theoretical relevance: A hypothesis should be related to a body of theory or some theoretical orientation. This requirement concerns the theoretical rationale of

- a hypothesis, i.e., what will be the theoretical gains of testing the hypothesis? If the hypothesis is related to some theory, research will help to qualify, support, correct or refuse the theory. A science can be cumulative only by building on an existing body of facts and theory. It can not develop if each study is an isolated investigation. When a research is systematically based on a body of existing theory, a genuine contribution to knowledge is more likely to result. Therefore, a hypothesis should possess theoretical relevance.
- ii. **Consistency:** A hypothesis should be logically consistent. Two or more propositions logically derived from the same theory must not be mutually contradictory.
 - iii. **Objectivity:** Scientific hypothesis should be free from value-judgment. In principle, the researcher's system of values has no place in scientific method. However, as social phenomenon are affected by the milieu in which they take place, the researcher must be aware of his values and state them explicitly.
 - iv. **Simplicity:** A hypothesis should be a simple one requiring fewer conditions or assumptions. But "Simple" does not mean obvious. Simplicity demands insight. The more insight the researcher, has in to the problem, the simpler will be for his hypothesis about it.
- ix. A good hypothesis does not conflict with any law of nature, which is known to be true.** We know that there are a number of conflicting theories of learning and teaching. These conflicts arise partly out of the failure of research workers to produce hypothesis that are in agreement with fact, and are not in conflict with any law of nature. When we say that there can be memory tablet for strengthening memory, we are trying to disprove well-established laws of nature.
- Types of Hypotheses**
- Theoretically there should be only one type of hypothesis, that is the research hypotheses-the basis for your investigation. However, because of the convention in scientific inquiries and because of the wording used in the construction of a hypothesis, hypothesis can be classified in to several types.
- Broadly, there are two categories of hypothesis:
- A. Research Hypothesis
 - B. Alternate Hypothesis



The formulation of alternate hypothesis is a convention in scientific inquiries. Its main function is to explicitly specify the relationship that will be considered as true in case the research hypothesis proves to be wrong. Again, as convention a null hypotheses or hypotheses of no difference is formulated as an alternate hypotheses. **Null Hypothesis** -indicates that there is no difference in the proportion of the population. It is usually written as H_0 .

A hypothesis in which a researcher stipulates that there will be a difference but does not specify its magnitude is called a **hypothesis of difference**.

The researcher might have enough knowledge about the topic in hand to speculate almost the exact prevalence of the situation in quantitative units. Such type of hypothesis is called a **hypothesis of point –prevalence**.

A hypothesis that speculates the extent of a relationship in terms of the effect of different independent variable on the dependent variable is known as **hypothesis of association**.

Based on the following example we can differentiate the types of hypotheses

Suppose you want to study the smoking pattern in a community in relation to gender differentials. The following hypotheses could be constructed.

- A. *There is no significance difference in the proportion of male and female smokers in the study population.*
- B. *A greater proportion of females than males are smokers in the study population.*
- C. *Sixty percent of females and thirty percent of males in the study population are smokers.*
- D. *There are twice as many female smokers as male smokers in the study population.*

Procedures for Hypotheses Testing

To test hypothesis means to tell (on the basis of the data that the researcher has collected) whether or not the hypothesis seems to be valid.

Procedures in hypothesis testing refers to all those steps that we undertake for making a choice between the two actions i.e., rejection and acceptance of a null hypothesis.

The various steps involved in hypothesis testing are stated below:

1. Making a formal statement
2. Selecting a significance level
3. Deciding the distribution to use
4. Computing an appropriate value
5. Calculation of the probability
6. Comparing the probability
7. Making the decision

Chapter Summary

The formulation of a research problem is the most important step in the research process. Any defect in it will adversely affect the validity and reliability of a study. Even though there are no specifically set guidelines, in this chapter, you learned a seven-step model in the formulation process of a research problem. These steps follow a logical sequence that takes a research beginner through the formulation process of a research problem.

In the formulation process, it is important to articulate the objectives of your study clearly. Objectives should be specific, free from ambiguity and each one should relate to only one aspect of the study.

Statement of hypothesis can also be one important element (though not essential) in the formulation of a research problem. A perfectly valid study can be conducted without constructing a single hypothesis. Hypotheses are important for bringing clarity, specifically and focus to a research study. A hypothesis is a speculative statement that is subjected to verification through a research study. In formulating a hypothesis, it is important to ensure that it is simple, specific, conceptually clear, able to be verified, rooted in a body of knowledge and able to be operationalized. A hypothesis can be categorized as descriptive hypothesis, relational hypothesis, working hypothesis, null hypothesis, statistical hypothesis, common-sense hypothesis, complex hypothesis, analytical hypothesis, research hypothesis and alternative hypothesis.

Chapter review questions**Choose the BEST answer from the alternatives**

1. Research problem can be defined through
 - A. Making the problem statement more specific
 - B. Focusing on the general aspect of the study
 - C. Collecting experience survey
 - D. All
2. Suppose you want to study the leadership potentials in an organization in relation to gender differentials. Then you have formulated a hypothesis as “A greater proportion of females than males do have high leadership potential in the study population.” What type of hypothesis is it?
 - A. Hypothesis of association
 - B. Hypothesis of point –prevalence
 - C. Hypothesis of difference.
 - D. Null Hypothesis
 - E. None
3. A difficulty or question which a researcher experiences in a theoretical or practical situation and wants to obtain a solution for it is termed as _____.
 - A. Research problem
 - B. Hypothesis
 - C. Variable
 - D. Concept
4. Sources of researchable problems does include:
 - A. Researchers’ own experiences
 - B. Practical issues that require solutions
 - C. Theory and past research
 - D. All of the above
5. Research hypotheses are _____.
 - A. Formulated prior to a review of the literature
 - B. Statements of predicted relationships between variables
 - C. Stated such that they can be confirmed or refuted
 - D. b and c
6. When do we realize the existence of research problem?
 - A. If there is clear objective to be achieved
 - B. If there is society to which the problem pertains
 - C. If there are alternative measures exist
 - D. All
 - E. None

CHAPTER THREE

Research Proposal

Chapter outline

- 3.1 What is research proposal?
- 3.2 Importance of research proposal
- 3.3 Elements of research proposal

3.1 Meaning of research proposal

A research proposal is an activity that incorporates decisions made during early research-project planning phase of the study including management –research questions hierarchy and exploration. **A research proposal** is a work plan, outline, prospectus, statement of intent, draft plan.

A proposal is an individual's or a company's offer to produce a product or render a service to a potential buyer or sponsor.

Research Proposal is an overall plan, scheme, structure and strategy designed to obtain answers to the research problems or questions. It outlines the various tasks you plan to undertake.

3.2 Importance of research proposal

- a. It serves as a basis for determining the feasibility of the project.
- b. It provides a systematic plan of procedures for the researcher to follow.
- c. It gives the research supervisor a basis for guiding the researcher while conducting the study.
- d. It reduces the possibility of costly mistakes.

3.3 Elements of research proposal

The major components of proposal include:

1. Title Page



A title ought to be well studied and give a definite and concise indication of what is to come.



The title of a research proposal should state your topic exactly in the smallest possible number of words.

- ☐ Put your name, the name of your department/faculty/college, the name of your advisor(s) and date of delivery under the title.
- ☐ First impressions are strong impressions: make your title an attention grabber.

2. Summary/Abstract

- The abstract is a one page brief summary of the thesis proposal.
- It needs to show a reasonably informed reader why a particular topic is important to address and how you will do it.
- Specify the question that your research will answer, establish why it is a significant question; show how you are going to answer the question.
- Do not put references, figures, or tables in the abstract.
- The abstract is a concise summary of the material presented in the proposal.
- Though it appears at the front of the proposal, it is written last.
- A well-prepared summary enables the reader to
- Identify the basic content of a document quickly and accurately,
- Determine its relevance to their interests, and
- Decide whether they need to read the document in its entirety.

3. Introduction/Background

The introduction of a research plan or proposal should place the research problem in its historical perspective; state the need for studying it, and the researcher's precise interests in the study of the problem. Remember that some of the contents suggested in this section may not be relevant to certain studies, so use your discretion in selecting only what is pertinent to your study. The literature review is of central importance in this section.

Start with a very broad perspective of the main subject area, before gradually narrowing the focus to the central problem under investigation. In doing so, cover the following aspects of your study area:

- The introduction is the part of the proposal that provides readers with the background information for the research proposal.
- The introduction should address the following points:
- Sufficient background information to allow the reader to understand the context and significance of the question you are trying to address.
- Proper acknowledgement of the previous work on which you are building.
- Sufficient references
- The introduction should be focused on the research question(s).
- All cited work should be directly relevant to the goals of the research.
- Explain the scope of your work, what will and will not be included.
- A verbal "road map" or verbal "table of contents" guiding the reader to what lies ahead.

4. Statement of the problem

Having provided a broad introduction to the area under study, now focus on the issues relating to its central theme, identifying some of the gaps in the existing body of knowledge. A rationale for your study with particular reference to how your

study will fill the identified gaps should be stated as well. The main unanswered questions need to be identified. Some of the main research questions that you would like to answer through your study should also be raised. Knowledge gained from other studies and the literature about the issues you are proposing to investigate should be an integral part of this section. In other words, once you are able to collect different studies conducted in your field of investigation from various sources and examine each one of them critically for the points mentioned above, you will be in a position to state your problem in unambiguous and more precise terms. Moreover, in this section, you as researcher should:

- Identify the issues that are the basis of your study;
- Specify the various aspects of/ perspectives on these issues;
- Identify what knowledge is available concerning your questions, specifying the difference of opinion in the literature regarding these questions if differences exist.

Usually, the problem of investigation is stated in two

- ways:-a) In the form of
statement or
b) In question form

In some cases, the problem is stated with the help of more than one statement or a question.

For example I above, the issues you should include in this section are the following:

- What theories have been developed to explain the relationship between advertising and product demand?
- What is the relationship between advertising and product demand: What theoretical model will be the basis of your study?
- What do previous theories and researches have to say regarding the components of the theoretical model and advertising, for example, the relationship between product advertising and:
 - Motivation of customers;
 - Purchase frequency of customers;
 - Attitudes of customers for a product
 - Rate of production and sale within a firm; and etc

In general :-

Statement of the problem encapsulates the question you are trying to answer.

Effective problem statements answer the question “***Why does this research need to be conducted.***”

5. Literature Review

On the selected theme, some studies might have been previously made by others so that it will bring out information on the theme. The primary aspects of those studies might be briefly described and the gaps may be pointed out. Does the selected study fill the gap? Or is it a replication of an earlier study made elsewhere? In the later case, the justification for studying the same problem may be stated with reference to environmental differences, time period differences, etc.

The literature review asks how similar and related questions have been answered before.

A literature review can be organized as:

- **Introduction:** define the topic, together with your reason for selecting the topic.
- **Body:** this is where you discuss your sources.
- **Conclusion:** summarize the major contributions, evaluating the current position, and pointing out flaws in methodology, gaps in the research, contradictions, and areas for further study

6. Objective/Aim Of The Study

Objectives inform a reader of what you want to achieve through the study. Therefore, it is extremely important to word them clearly and specifically. You spell out the objectives/purposes of the present study in the form of statements and while doing so, you take care that the objectives mentioned are well within the scope of the investigation envisaged by you.

The formulation of objectives will help you to:

- **Focus** the study (narrowing it down to essentials);
- **Avoid** the collection of data which are not strictly necessary for understanding and solving the problem you have identified; and

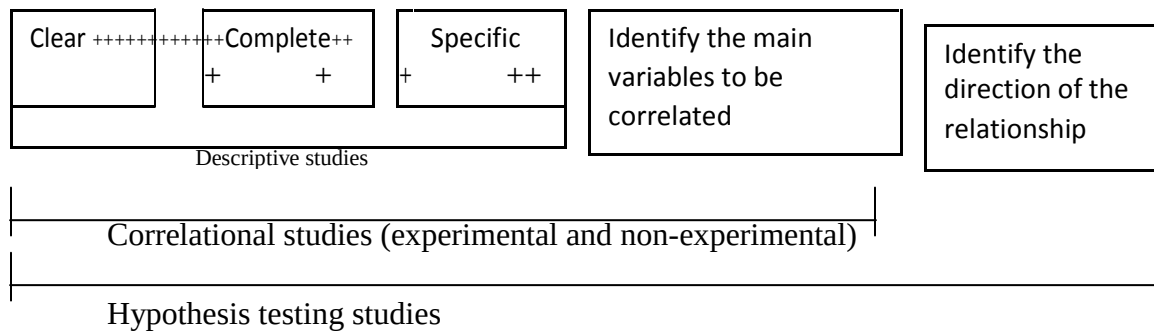
- **Organize** the study in clearly defined parts or phases

The objectives of the study are listed under two headings:

- ❖ *Main objective; and*
- ❖ *Sub-objectives/Specific objectives*

The *main objective* is an overall statement of the thrust of your study. It is also a statement of the main associations and relationships that you seek to discover or establish. The *sub-objectives* are the specific aspects of the topic that you want to investigate within the main framework of your study. Sub-objectives should be numerically listed. They should be worded clearly and unambiguously. Make sure that it contains only one aspect of the study.

The objectives should start with such action words as “to determine”, “to find out”, “to ascertain”, “to measure”, “to explore”, etc. The wording of your objectives determines the type of research design (e.g., descriptive, correlational or experimental, or others) you need to adopt to achieve them. The following figure displays the characteristics of the wording of objectives in relation to the type of research study:



If your study is descriptive, the main objective of the study should clearly describe the main focus of your study, even mentioning the organization and its location unless these are to be kept confidential (e.g., *to find out the opinion of the community about the services provided by Small and Micro Enterprise, SMEs, operating in Arba Minch town*).

If your study is correlational in nature, in addition to the above proprieties, the wording of the main objective should include the main variables to be correlated (e.g., *to ascertain the impact of SMEs on poverty alleviation, or to compare the effectiveness of different advertising media on demand creation*).

If the thrust of your study is to test hypothesis, the wording of the main objective-in addition to the above properties- should indicate the direction of the relationship being tested (e.g., *to ascertain if an increase in youth unemployment will increase the incidence of street crime, or to demonstrate that the provision of maternal and child health services to native people living in rural Ethiopia will reduce infant mortality*).

For example I above, the objectives can be stated in the following manner:

Main objective:

To examine the relationship between advertising and product demand in A/Minch town

Specific objectives:

- To find out the relationship, if any, between advertising and motivation of customers to purchase a product;
- To ascertain the association between advertising and purchase frequency of customers;
- To explore the relationship between advertising and attitudes of customers toward a product
- To examine the links between advertising and rate of production
- To examine the links between advertising and rate of sale with in a firm;

7. Hypotheses /Questions

Hypothesis is a testable statement of a potential relationship between two or more variables (See the previous discussion on the Hypotheses). If you are going to test hypotheses, list them in this section.

From example I, the following hypotheses can be formulated:

H1= Customers' demands for a product and product advertising are positively correlated.

H2= The higher the advertising, the higher the product purchase frequency of customers;

H3= Product advertising is positively correlated with attitudes of customers toward a product

Hn= etc

-
- Hypotheses and questions are linked to the speculative proposition of the problem statement.
 - the term hypotheses implies a derivation, within a hypothetic-deductive theoretical system, of a particular assertion or prediction.
 - Hypotheses are tentative statements/solutions or explanations of the formulated problem
 - The hypothesis is subject to test, i.e., to confirmation or rejection on empirical grounds.
 - The term question implies an interrogative statement that can be answered by data.

8. Significance of the study

While preparing the research proposal, you as a researcher have to incorporate the justification for the need of the research. You should justify the importance and urgency of the study, as to how the results of your study will be useful to the beneficiaries. This step would also prevent wastage of research effort on unimportant or insignificant problems. Problems should be broad-based enough to provide an investigation of real significance. As a research worker, you would assess to what extent the solution of the problem would contribute for the furtherance of human knowledge. The list of the objectives of the study magnifies further its utility and importance.

The following are some of the main components the justification stresses:

- The need for new knowledge, techniques or conditions
- The need to help address those areas that remain untouched or inadequately treated.
- The need to fill the gap in the knowledge pertaining to the given area.

9. Scope of the Investigation

Here the investigation states the restrictions and limitations which he/she imposes on his/her study. It is statement of the limits or scope of the investigation. This statement will provide information concerning who, what, where and how many. It will determine the boundaries of the project in hand. Again it will be important to mention as to how many subjects will constitute the sample of the study and how they will be distributed over the institutions, geographical areas of time intervals. The age level, grade level, ability level, achievement level, etc. will also be specified.

The scope of any investigation is dependent on several factors such as

- (a) The time and money availability to the investigator,
- (b) A availability of a sample,
- (c) Accessibility of the investigator to the respondents, and
- (d) The amount of time the respondents can spare for the investigator, etc.

10. Problems and limitations

This section should list problems you thought you might encounter concerning, for example, the availability of data, securing permission from the agency/ organization to carry out he study, obtaining the sample, or any other aspect of the study.

Any limitations that could affect the validity of your conclusions and recommendations should be communicated to the reader.

Here the problems refer to difficulties relating to logistical details, where as limitations designate structural problems relating to methodological aspects of the study. For example, the study design you choose may not be the best but you may adopt it for a number of reasons. This is classified as limitation of the study. It is also true for sampling or measurement procedures.

11. The structure of the report

As clearly as possible, state how you intend to organize the final report (see the last chapter). In organizing your material for the report, specific objectives of your study are of immense help. Plan to develop your chapters around the main themes of your study. The title of each chapter should communicate the main thrust of its contents.

The first chapter, possible entitled “Introduction”, should be an overall introduction to your study, covering most of your project proposal and pointing out deviations, if any, from the original plan. The second chapter should provide some information about the study population itself, i.e., some of its socio-economic-demographic characteristics. Titles for the rest of the chapters will vary from study to study but each chapter should be written around the main theme.

Example

The report will have the following chapters:

Chapter 1: Introduction

Chapter 2: Research design and methodology

Chapter 3: Literature review: Customers' motivation, Customers' attitude toward a product, customer purchase frequency, and etc and product advertising

Chapter 4: Customers' motivation product advertising, Customers' attitude toward a product and product advertising, customer purchase frequency and product advertising,

Chapter 7: Summary, conclusions and recommendations

12. Conceptualization of the different terms used in the Investigation

The researcher should be clear about the meaning of every term he uses. It not only helps him but also the other investigators, respondents and readers of the research report in understanding the different terms without any ambiguity. Normally, these concepts are explained either in the form of nominal definitions or in the form of operational definitions. **Nominal definitions** are used in cases where a given word is synonymous with certain other expressions, the meanings of which are already established.

In the second type of definition, the major concepts used in the title of the study, its objectives, the investigative questions and the hypotheses should be identified. A variable or a concept is said to be **operationally defined** when the steps in its observation or measurement are clearly stated. Thus, an operational definition of a concept helps the investigator in obtaining reliable results, without which he/she can not establish any fact scientifically which in its turn makes the problem of investigator much more complex in his/her attempt to accept or refute the hypothesis under consideration with more authenticity.

Sometimes, the investigators even define a variable operationally with the help of items in the questionnaire or interview schedule.

The investigator usually engages him/her self in the following exercises before arriving at the operational definitions of different terms. The investigator will:-

- a) discover the various dimensions involved within the concept
 - b) correlate these different dimensions so that all possible types can be discerned
 - c) reduce the number of types to be studied
 - d) translate those types selected for study into operational categories and empirical indices
-
- i. In abstract terms given the general meaning it intends to convey, and
 - ii. In terms of operational categories by which it is represented in a particular study.
(For more understanding, refer back to the previous discussion on the same issue.)

13. The study design

Describe the study design (as discussed before) you plan to use to answer your research question. For example, state whether you use “cross sectional, experimental, or any other design). Identify the strengths and weaknesses of your study design. Moreover, at least the following important elements need to be included in your study design:

- Who make up the study population? Can each element of the study population be identified? If yes, how?
- Will a sample or the total population be studied,
- How will you get in touch with the selected sample?
- How will the sample’s consent to participate in the study be sought?
- How will the data be collected (e.g., by interview, questionnaire or by observation)?
- In the case of a mailed questionnaire, to what address should the questionnaires be returned?
- Are you planning to send a reminder?
- How will confidentiality be preserved?
- How and where can respondents contact you if they have queries?

Example: Now a different example is considered for explanation.

It is proposed that the study will be carried out in two government high schools in Arba Minch town. The principals of the schools most accessible to the researcher will be contacted to explain the purpose of the study and the help needed from the school, and to seek their permission for the students to participate in the study. As the constraints of time and resources do not permit the researcher to select more than two schools, negotiations with other schools will cease when two schools agree to participate in the study.

It is proposed to select year 9 students as the academic achievement of students in years 8 and 10 could be affected by factors unique to them. Year 8 students may be experiencing anxiety as a result of having just made the transition to a new system. The motivation of students in year 10 could be affected by their being at the stage in their education where they must decide if they will continue on at school.

In order to control the variance attributable to the gender of a student, it is proposed to select only male students.

Once the principal of school agrees to allow the study to be carried out, the researcher will brief the teacher in charge about the study and its relevance, and will arrange a date and time for administering the questionnaire.

When the students are assembled ready to participate in the study, the researcher will explain its purpose and relevance, and then distribute the questionnaire. The researcher will remain in the class to answer any questions the students might have.

14. Selection of the Sample

It is needless to say that no investigator can study the entire population and hence selects a few individuals belonging to a population for the purpose of his investigation. These selected individuals form a sample and while selecting these individuals, the investigator should consider the following facts:-

- i) **Definition of the population:** - The investigator should define population in operational terms, describing it with all the necessary identifiable characteristics. This helps the investigator in selecting the sample depicting the same characteristics with more ease and further helps the investigator in generalizing his findings of the present investigation with more authenticity. Thus the only difference between the population and the sample is their size and except for that, the sample is exactly similar to the population in all the characteristics.
- ii) **Sample size:-** Depending on the mode of research, the sample size varies. For example, in experimental research, the sample size is very small compared to that of descriptive research. It is always advisable to collect data from more number of individuals than required by sample size to take care of any casualty particularly in the case of problems where the data is to be collected from the same sample repeatedly at different times. Sample size is usually determined by estimating the reliability of statistics calculated from the data collected from different sizes of the samples.
- iii) **Representativeness of the Sample:** - When a sample is selected, it is assumed that it represents the population for which it stands. Failure of this is failure of entire research study. This is very fundamental and crucial in any research design to give sense to any research study undertaken. Thus the investigator should use his ingenuity in carefully selecting the appropriate technique of sample selection.

Probability Sampling

- ☐ Simple random sampling
- ☐ Systematic sampling
- ☐ Cluster sampling
- ☐ Stratified sampling

Non probability Sampling

- ☐ Convenience sampling
- ☐ Referral sampling
- ☐ Judgment sampling
- ☐ Quota sampling

Example

The selection of schools will be done primarily through Quota sampling. Schools will be selected on the basis of their geographical proximity to the researcher. The researcher will prepare a list of schools, in rank order, of accessibility. Once two schools agree to participate in the study, negotiations with other schools will cease.

All year 9 male students will constitute the study population. It is expected that the sample will not exceed 100 students.

15. Data Collection (Methods and Instruments)

Construction/adaptation of Instruments

The investigator should now find instruments for collecting the data required by the hypothesis. The investigator himself may have to construct these instruments or he may have to adopt the readily available instruments to suit the local conditions. In the latter case, the investigator may make certain necessary changes in the format and etc, with the help of the feedback received by conducting a *pilot study* on a very small sample.

Besides using the instruments like questionnaires, interview schedules, projective techniques, attitude scales, etc, the investigator may adopt other methods like observation, examination of records and so forth for data collection. Each of these various methods has its own advantages and limitations, which will be discussed in detail in the forth-coming chapters.

Administration of the Questionnaires/Tests

Depending on the nature of the questionnaire/test and the purpose of the investigation, the investigator decides whether to administer the questionnaire/test individually or in small groups or in large groups.

16. Methods of Data Analysis

Complete planning of analysis in advance is not always possible or even desirable; new idea occurs to the investigator as he/she collects the data. But except in exploratory studies, it is always possible and desirable to workout in advance the basic outlines of the analysis. Depending on the nature of the data and the information required by the hypothesis, the investigator should subject the data to appropriate statistical analysis.

In this section, you need to describe the strategy you intend to use for data analysis. Specify whether the data will be analyzed manually or by computer. For computer analysis, identify the program and the statistical procedures you plan to perform on the data. Also identify the main variables for cross-tabulation.

Example

Frequency distribution in terms of:

- Customers' motivation;
- Customers' purchase frequency,
- Customers' attitude toward a product, etc...

Cross tabulations:

Advertising

- Customers' motivation;
- Customers' purchase frequency,
- Customers' attitude toward a product, etc...

17. **Work Plan**



Work plan is a schedule, chart or graph that summarizes the different components of a research proposal and how they will be implemented.



In the work plan

Different components/phases/stages of the study should be stated
Description of activities in each phase

Time required to accomplish the various aspects of the study should also be indicated



A GANTT chart is a planning tool that depicts graphically the order in which various tasks must be completed and the duration of each activity.



The GANTT chart indicates:

the tasks to be performed;

who is responsible for each task; and

the time each task is expected to take.

	To be completed by (Months in 2009)											
Tasks									S e p		N o v	
Proposal writing												
Instrument construction												
Reviewing and writing related literatures												
Data collection												
Coding												
Data analysis												
Report(first draft)												
Report(final draft)												
Typing												
Presentation and communication												

18. Budget And Funding



Budget items need to be explicitly stated

Cost for every budget item should be quantitatively shown

Their might be a need for budget justification of certain costs whose requirement is not obvious

Personnel: Salaries and wages

Consumable supplies:

Equipments

Travel

Communications

Publication

Other direct costs

Indirect costs

Overhead costs for institutions or associations
General administrative cost
Operational and maintenance
Depreciation and use allowance

19. References

References may be made in the main text using index numbers in brackets (Vancouver style) or authors name (Harvard style).

- **For a journal paper give:**

- the names of the authors,
- the year of publication, ○
- the title of the paper,
- the title of the journal,
- the volume number of the journal,
- the first and last page numbers of the paper.

the author,

the year of publication,

the title, and the edition number if there is one,

the name of the publisher,

the page numbers for your reference.

the author of the web page,

the title of the item on the web page,

the date the item was posted on the web page

the date the item was accessed from the web page

the complete and exact URL.

20. Appendices/Annexes

Include in the appendices of your proposal any additional information you think might be helpful to a proposal reviewer. Example,

Appendix includes:

Questionnaire & other collection forms

Dummy tables

Biographical data on the principal investigator

The consent form (if any)

Chapter Summary

Dear learner! Let us now summarize the main points covered in this chapter. As you remember, the discussion was all about the research proposal: Research Proposal is an overall plan, scheme, structure and strategy designed to obtain answers to the research problems or questions. It outlines the various tasks you plan to undertake. The basic components of the research design or proposal were covered and the elements include title of the investigation, introduction/background of the study, statement of the problem, objectives of the study, review of the previous studies, significance of the study, conceptual model, formulation of Hypothesis, Conceptual definitions of the different terms used in the investigation, scope of the Investigation , study design, sampling and population , methods and instruments, the structure of research report, problems and limitations of a study , work/time schedule, budget, and finally bibliographies.

Chapter review Questions**Choose the *BEST* answer from the alternatives**

1. The part of research proposal where the reason why we conduct the study can be mentioned under is -----
 - A. Background of the study
 - B. Research question
 - C. Problem statement
 - D. Methodology
2. In writing research proposal abstract should be placed after table of content.
3. A proposal tells us-----?
 - A. What will be done?
 - B. Why it will be done?
 - C. How it will be done?
 - D. Where it will be done?
 - E. All of the above.
4. Preliminaries/Prefatory section of a proposal include all of the following, except?
 - A. Title page.
 - B. Abstract.
 - C. Acronyms and abbreviations.
 - D. Statement of the problem.
5. -----Represents a brief description/an executive summary/of each element contained in your proposal.
 - A. Abstract.
 - B. Acronyms.
 - C. Objectives.
 - D. Methodology.

CHAPTER FOUR

Research Design

Introduction

Dear learner! Having decided what, you want to study about and its proper formulation, the next question is how are you going to conduct your study? What procedures will you adopt to obtain answers to research questions? How will you carry out the tasks needed to complete the different components of the research process? What should you do and what should you not do in the process of undertaking the study? These are some of the questions that need to be answered (in your research plan) before you pursue your study.

Chapter outline

- 4.1 Meaning of research design
- 4.2 Need for research design
- 4.3 Characteristics of a good research design
- 4.4 Types of research designs
- 4.5 Concepts related to research design

4.1 Meaning of Research Design

Research design has been defined by different social scientists in different terms. All these definitions emphasize systematic methodology in collecting accurate information for interpretation with economy in procedure. To mention a few definitions, Miler has defined “research design” as “the planned sequence of the entire process involved in conducting a research study”. According to Selltitz et al, “Research design is a catalogue of the various phases and facts relating to the formulation of a research effort. It is an arrangement of the essential conditions for collection and analysis of data in a form that aims to combine relevance to research purpose with economy in the procedure”.

A few other definitions of research design are “a research design designates the logical manner in which individuals or other units are compared and analyzed; it is the basis of making interpretations from the data.”

“The challenge of research design is to translate the general scientific model into a practical research operation. Research design will refer to the entire process of planning and carrying out a research study.”

“Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and control variance”. The plan is the complete program of the research. It includes an outline of what the investigator will do from writing the hypothesis and their operational implications to the final analysis of data (Kerlinger, 1986:279).

More explicitly, the design decisions happen to be in respect of:

1. What is the study about?

2. Why is the study being made?
3. What are the objectives of the study?
4. What are the propositions to be tested (if any?)
5. What is its scope?
6. What are the major concepts to be defined operationally?
7. On the basis of what criteria/measurements are the operational definitions made?
8. Where will the study be carried out?
9. What periods of time will the study include?
10. What type of data is required?
11. Where can the required data be found?
12. What is the study population?
13. What will be the sample design?
14. What techniques of data collection will be used?
15. How will the data be processed and analyzed?
16. What is the significance of the study?
17. To what target audience the reporting of the finding is meant?
18. In what style will the report be prepared?
19. What is the time period required for each stage of research work?
20. What is the cost involved?

Any kind of research incorporates all the essential components of research design but more importance is given to certain aspects of a research design in a particular type of research compared to the other.

4.2 Need for research design

Just as we need a blue print (or the map of a house) well thought-out and prepared by an expert or architect, so we need a research design or plan in advance of data collection and analysis. Generally speaking, a thoroughly thought research design is needed for the following reasons:

- It helps the researcher to organize his ideas in a form whereby it will be possible for him to look for flaws and inadequacies;
- It facilitates the smooth running of various research operations;
- It makes a research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money;
- It serves as framework for the process of reliable and valid data collection and analysis;
- It saves the researcher from offering hasty generalizations or misleading conclusions;
- It serves as a basis for others to provide their genuine comments and comprehensive review of the proposed study.

Therefore, preparation of the research design should be made with greater care as any error in it may upset the entire project.

4.3 Characteristics of a good research design

The selection of a method or methods of logic and the planning of the design in time do not guarantee sound results. These are only first steps. The research design at the most, is a blueprint, and therefore at best it is only tentative.

Every design has its own strengths and weaknesses and at the same time there is no such thing as a single correct design. A good research design should satisfy the following four conditions: objectivity, reliability, validity and generalizability of findings.

- a) **Objectivity:** The objectivity of the findings pertains to the methods of collection of data and scoring of the responses. The objectivity of the procedure (either collection of data or scoring of the responses or both) may be judged by the degree of agreement between the final scores assigned to different individuals by more than one independent observers. The more subjective the observation, recording and evaluation of the responses; the less the different observers agree.

The investigators who use close-ended questionnaires are said to be collecting data with the help of objective tools because all the scorers can apply a scoring key and agree perfectly on the result. In contrast, the open-ended questionnaires allow room for great disagreement among the scorers. However, in certain instances, the questionnaires consisting of both the types of items are used purposefully. In such instances, free response items and observations can be made fairly objective by giving careful instructions and guidelines to the observer or scorer.

Thus, any research design should permit the use of measuring instruments which are fairly objective in which every observer or judge seeing a performance arrives at precisely the same report. This ensures the objectivity of the collected data, which will be used for the analysis, inferences and generalizations.

- b) **Reliability:** Reliability refers to “Consistency” throughout a series of measurements. That is to say, if a respondent gives out a response to a particular item, he is expected to give the same response to that item whenever he is asked subsequently. On the contrary, if the respondent keeps on changing his responses to the same item when he is asked repeatedly, then the investigator will be facing a difficulty in considering which one of these responses is the genuine response of the respondent. So, the investigator should frame his items in such a way that the respondent can give only one genuine response. There are different methods in determining the reliability of the responses given out by a respondent. Some of these methods are: - Using “check items”, administering the same test repeatedly, using a series of “parallel” forms, etc.
- c) **Validity:** Any measuring instrument is said to be valid when it measures what it purports to measure. For example, an intelligence test, constructed for measuring intelligence should measure only intelligence and nothing else. As in the case of reliability, there are a good

number of procedures for establishing the validity of test. Some such procedures are: validating the present data against a “concurrent” criterion or a future criterion or a theory, etc.

d) Generalization/Generalizability: Once it is ensured that the measuring instruments used in a research investigation yield objective, reliable and valid data, the next important problem a well planned research design has to answer is the “generalizability” of the findings of the present study. That is *how best the data collected from a sample can be utilized for drawing certain generalization applicable to a larger group (population) from which the sample is drawn*. In other words, with how much authority and confidence an investigator can say that the same findings will be obtained even though the data is collected from the total population from which the sample is selected. A research design, thus helps an investigator in his attempt to generalize the findings, provided he has taken due care in defining the population, selecting the sample and using the appropriate statistical analysis while planning his research design. Thus a good research design should ensure that:-

- a) The measuring instruments can yield objective, reliable and valid data
- b) The ‘population’ is defined in unequivocal terms
- c) The requisite size of the sample is collected by using the most appropriate technique of sample selection
- d) The appropriate statistical analysis has been employed, and
- e) The findings of the present study can be ‘generalized’ without being contaminated by the errors of measurement or sampling errors or any other interfering factors.

4.4 Types of research designs

The study design is a part of the research design. It is the design of the study in isolation, whereas the research design also includes other details related to the carrying out of the study.

The various designs have been classified by examining them from **three** different perspectives.

1. The number of contacts with the study population.
2. The reference period of the study.
3. The nature of the investigation.

4.4.1 The number of contacts with the study population.

1. Cross-sectional studies

It is also known as one-shot or status studies. It is Study some phenomenon by taking a cross section (only once) of it at one time. These studies are the most commonly used design in the social sciences. They are best suited to studies aimed at finding out the prevalence of a phenomenon, situation, problem, attitude or issue. Such studies are cross-sectional with regard to both the study population and the time of investigation. As these studies involve only one contact with the study population, they are comparatively cheap

to undertake and easy to analyze. However, their biggest disadvantage is that they cannot measure change.

2. The before-and-after study design

A before-and-after design can be described as two sets of cross-sectional observations on the same population. It is comprised of two cross-sectional observations, the second being undertaken after a certain period. It is also known as the pretest/post-test design. The main advantage of the before-and-after design is that it can measure change.

It is one of the most commonly used designs in evaluation studies (i.e., for measuring the impact or effectiveness of a program). The difference between the two sets of observations with respect to the dependent variable is considered to be the impact of the program.

The disadvantages are:

- More expensive and more difficult to implement.
 - In some cases the time lapse between the two contacts may result in attrition in the study population.
 - As it measures total change, you cannot ascertain whether independent or extraneous variables are responsible for producing change in the dependent variable. Also, is it not possible to quantify the contribution of independent and extraneous variables separately.
 - If the study population is very young and if there is a significant time lapse between the before-and-after observations, changes in the study population may be because it is maturing.
 - **5. Reactive Effect:** Sometimes the instrument itself educates the respondents. This is known as the **reactive effect** of the instrument.
 - **Regression effect:** may occur when you use a research instrument twice to gauge the attitude of a population towards an issue is a possible shift in attitude between the two observations.
3. **Longitudinal study design:** Is used to determine the pattern of change in relation to time. Longitudinal studies are also useful when you need to collect factual information on a continuing basis. Although the data collected is from the same study population, it may or may not be from the same respondents. A longitudinal study can be seen as a series of repetitive cross-sectional studies.

Longitudinal studies have the same disadvantages as before-and-after studies, in some instances to an even greater degree.

In addition, longitudinal studies can suffer from the conditioning effect. This describes a situation where, if the same respondents are contacted frequently, they begin to know what is expected of them and may respond to questions without thought, or they may lose interest in the inquiry, with the same result.

The main advantage of a longitudinal study is that it allows the researcher to measure the pattern of change and obtain factual information requiring collection on a regular or continuing basis.

4.4.2 The reference period of the study.

The reference period refers to the time-frame in which a study is exploring a phenomenon, situation, event or problem. Studies within this perspective are thus categorized as:

- a. **Retrospective studies** : - investigate a phenomenon, situation, problem or issue that has happened in the past. They are usually conducted either on the basis of the data available for that period or on the basis of respondents' recall of the situation. For example, studies conducted on the following topics are classified as retrospective studies:
 - The living conditions of aboriginal people in Ethiopia in the early twentieth century.
 - The utilization of land before World war II in Ethiopia.
 - A historical analysis of migratory movements in Eastern Europe between 1915 and 1945.
- b. **Prospective studies**: - refer to the likely prevalence of a phenomenon, situation, problem, attitude or outcome in the **future**. Such studies attempt to establish the outcome of an event or what is likely to happen. Experiments are usually classified as prospective studies as the researcher must wait for an intervention to register its effect on the study population. The following examples are classified as prospective studies:
 - To determine, under field conditions, the impact of maternal and child health services on the level of infant mortality.
 - To establish the effects of a counseling service on the extent of marital problems.
- c. **Retrospective-prospective studies**: focus on past trends in a phenomenon and study it into the future. In a retrospective-prospective study a part of the data is collected retrospectively from the existing records before the intervention is introduced and then the study population is followed to ascertain the impact of the intervention. Trend studies, which become the basis of projections, fall into this category. Some examples are:
 - The effect of random breath testing on road accidents.
 - The impact of incentives on the productivity of the employees of an organization.

4.4.3 The nature of the investigation.

On the basis of the nature of the investigation, studies can be classified as:

- Experimental;
- Non-experimental; and
- quasi or semi-experimental.

4.5 Some important concepts Related to Research Design

4.5.1. Variable and concept

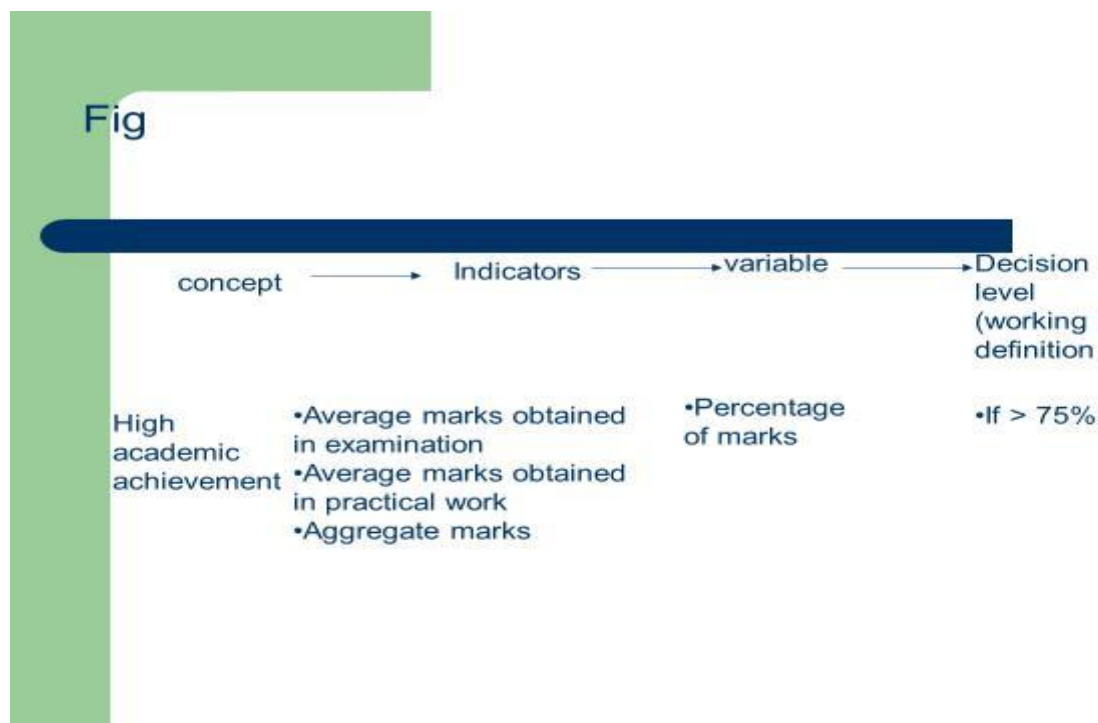
An image, perception or concept that is capable of measurement-hence capable of taking on different values-is called a variable. In other words, a concept that can be measured is called a variable. A variable is a property that takes on different values.

The difference between a concept and a variable

Concepts are mental images or perceptions and therefore their meanings vary markedly from individual to individual, whereas variables are measurable. Measurability is the main difference between a concept and a variable. A concept cannot be measured whereas a variable can be subjected to measurement by crude/refined or subjective/ objective units of measurement.

Concepts are subjective impressions-their understanding may differ from person to person. It is, therefore, important for the concepts to be converted into variables as they can be subjected to measurement even though, the degree of precision with which they can be measured varies from scale to scale. If you are using a concept in your study, you need to consider its operationalization, that is, how it will be measured. To operationalize a concept, you first need to go through the process of identifying indicators

Indicators are a set of criteria reflective of the concept-which can then be converted into variables.



Types of variable

A variable can be classified in a number of ways.

The classification developed here results from looking at variables in three different ways:

1. The causal relationship
2. The design of the study and
3. The unit of measurement

1. The causal relationship

In studies that attempt to investigate a causal relationship or association, four sets of variables may operate:

- **Change variables**, which are responsible for bringing about change in a phenomenon;
- **Outcome variables**, which are the effects of a change variable; Variables which affect the link between cause and effect variables; and
- **Connecting or linking variables**, which in certain situations are necessary to complete the relationship between cause and effect variables.

In research terminology;

- Change variables are called **independent variables**
- Outcome/effect variables are called **dependent variables**
- the unmeasured variables affecting the cause and effect relationship are called **extraneous variables**
- the variables that link a cause and effect relationship are called **intervening variables**.

Independent variable – the cause supposed to be responsible for bringing about change(s) in a phenomenon or situation.

Dependent variable – The outcome of the change(s) brought about by changes in an independent variable.

Extraneous variable- several other factors operating in real-life situation may affect changes attributed to independent variables. These factors, not measured in the study, may increase or decrease the magnitude or strength of the relationship between independent and dependent variables.

Intervening variable- Sometimes called the confounding variable, links the independent and dependent variables.

2. The design of the study

A study that examines association or causation may be a controlled/ contrived experiment, a quasi-experiment, or an ex post facto study.

In controlled experiments the independent (cause) variable may be introduced or manipulated either by the researcher or by someone else who is providing the service.

In these situations there are two sets of variables:

- **Active variables** – those variables that can be manipulated, changed or controlled.

- **Attribute variables** – those that cannot be manipulated, changed or controlled, and reflect the characteristics of the study population, e.g., age, gender, education and income.

3. The unit of measurement

From the viewpoint of the unit of measurement, there are two ways of categorizing variables:

Whether the unit of measurement is categorical (as in nominal and ordinal scales) or continuous in nature (as in interval and ratio scales); and Whether it is qualitative (as in nominal and ordinal scales) or quantitative in nature (as in interval and ratio scales). The variables thus classified are called categorical or **continuous, and qualitative or quantitative**.

On the whole there is very little difference between categorical and qualitative, and between continuous and quantitative variables.

a. Categorical variables can be of three types:

- **Constant variables;** When a variable can have only one value or category, e.g., taxi, tree, water,
- **Dichotomous variables;** When a variable can have only two categories as in yes/no; good/bad; rich/poor,
- **Polytomous variables.** When a variable can be divided into more than two categories, e.g., religion (Christian, Muslim, Hindu); Political parties (EPDRF, EDP, Coalition); attitudes (strongly favorable, favorable, uncertain, unfavorable, strongly unfavorable),

b. Continuous variables, on the other hand, have continuity in their measurement. For example, age, income, an attitude score. They can take on any value on the scale on which they are measured. Age can be measured in years, months and days. Similarly, income can be measured in Birr and cents.

4.5.2 Measurement scales

Measurement is central to any scientific inquiry. The greater the refinement in the unit of measurement of a variable, the greater the confidence, other things being equal, one can place in the findings. Scaling is how we get numbers that can be meaningfully assigned to objects.

Scales, based on their properties, can be classified as:

Nominal scales merely classify without indicating order, distance or unique origin.

Ordinal scales indicate magnitude relationship of 'more than' or 'less than', but indicates no distance or unique origin.

Interval scales have both order and distance values but no unique origin.

Ratio scales possess all these features (distance, order, and origin).

Chapter Summary

Dear learner! Let us now summarize the main points covered in this chapter. As you remember, the discussion was all about the research design: a plan, structure, and strategy of investigation so conceived as to obtain answers to a research problem. It acts as a blue print and is prepared before data collection and analysis. A good research design satisfies four important conditions: objectivity, reliability, validity and generalizability of findings. Lastly some important concepts related to research design i.e. the different types of variables (dependent, independent link, affect constant dichotomous, polytomous) and measurement scales (nominal, ordinal, interval, ratio) have been discussed.

Chapter review questions**Choose the *BEST* answer from the alternatives**

1. Which sentence express research design?
 - A. Is a plan and structure of investigation
 - B. It expresses the structure of research problem.
 - C. It is economical procedure to achieve research objectives.
 - D. All.
 - E. None
2. Any variable that are not related to the purpose of the study, but may affect the dependent variable is:
 - A. Dependent variable
 - B. Independent variable
 - C. Extraneous variable
 - D. None
3. Represents research design carried out once and represent a "snapshot" of one point in time;
 - A. Cross-sectional design.
 - B. Longitudinal design.
 - C. Experimental design.
 - D. None of the above.
4. _____ indicates both the order and the distance between the variables
 - A. Nominal scale
 - B. Ordinal scale
 - C. Interval scale
 - D. All
5. When a variable can have only two categories the variable is called
 - A. Dichotomous
 - B. Polytomous
 - C. Continuous variables
 - D. All
6. Longitudinal studies;
 - A. Study some phenomenon by taking a cross section (only once) of it at one time.
 - B. Are best suited to studies aimed at finding out the prevalence of a phenomenon, situation, problem, attitude or issue.
 - C. Can measure change.
 - D. None
7. A study design that attempts to establish the outcome of an event or what is likely to happen is;
 - A. Prospective study design
 - B. Retrospective study design
 - C. Retrospective prospective design
 - D. None

8. Which one is a correct combination?
- A. independent variable – out come variable
 - B. intervening variable – link variables
 - C. dependent variable -- change variable
 - D. intervening variable --extraneous variables
 - E. link variable --affect variable

CHAPTER FIVE

SAMPLE DESIGN AND PROCEDURE

5.1. Introduction

Dear learner! In the last four chapters, we covered discussions on the first two major steps in a research process. Now you are going to learn the third step: determination of sample design. In this particular chapter, the main issues to be addressed include sampling methods and their merits and demerits, the objectives and basis of sampling, the assumptions underlying sampling, types of sampling techniques, steps in sampling design and how to determine a sample size, qualities of a good sampling design, and finally the concepts related to sampling and non-sampling errors will be explained in depth.

Chapter outline

5.1 Some Fundamental Definitions

5.2 Sampling Procedure

5.3. Sampling Techniques

5.4 sample size and sampling errors

5.1 Some Fundamental Definitions

Sampling is simply the process of learning about population on the basis of a sample drawn from it. Under this method, a small group of the universe is taken as the representative of the whole mass and the results are drawn. It is a method to make social investigation practicable and easy. “A statistical sample is a miniature picture or cross section of the entire group or aggregate from which the sample is taken. A sample is the refraction of the universe and bears all the characteristics of the universe.

Sampling is the process of using a small or parts of a larger population to make conclusions about the whole population.

Sampling is one of the components of research design. Sampling design involves several basic questions:

- Should a sample be taken?
- If so, what process should be followed?
- What kind of sample should be taken?
- How large it should be?
- What can be done to control and adjust for non response errors?

6.2 Basic Terminologies in Sampling

1. **Population (Universe):** The aggregate of all elements, sharing some common set of characteristics that comprises the universe for the purpose of marketing research problem.
2. **Target population:** the specific complete group relevant to the research group.
3. **Population element:** an individual member of a specific population.
4. **Census:** a complete enumeration of the elements of a population or study objects.
5. **Sample:** a subgroup of the elements of the population selected for participation in the study.
6. **Sampling Frame:** a representation of the elements of the target population. It consists of a list or set of directions for identifying the target population.
7. **Representative Frame:** a sample that reflects the population accurately so that it is a microcosm of the population.
8. **Probability Sampling:** a sampling procedure in which each element of the population has a fixed probabilistic chance of being selected for the sample.
9. **Non-Probability Sampling:** sampling techniques that do not use chance selection procedures, rather, they rely on the personal judgment of the researcher.
10. **Sampling With Replacement:** a sampling technique in which an element can be included in the sample more than once.
11. **Sampling Without Replacement:** a sampling technique in which an element cannot be included in the sample more than once.
12. **Sampling Units:** a single element or group of elements subject to selection in the sample. (PSU)
13. **Primary Sampling Unit (PSU):** a unit selected in the first stage of the sampling.
14. **Secondary Sampling Unit (SSU):** a unit selected in the second stage of sampling.
15. **Sample Size:** The number of elements to be included in a study.
16. **Sampling Error:** the difference between a sample and the population from which it is selected, even though a probability sample has been selected.
17. **Non-Sampling Error:** differences between the population and the sample that arise either from deficiencies in the sampling approach, such as an adequate sampling frame or non-response, or from such problems.
18. **Non –Response:** a source of non-sampling error that is particularly likely to happen when individuals are being sampled. It occurs whenever some members of the sample

refuse to cooperate, can not be contacted, or for some reason can not supply the required data, because of mental incapacity.

5.2 Sampling Procedure

The sample design is the blueprint for the method of selection of the sample; still there are certain fundamental factors which are to be considered. These are:-

- i. *Type of the universe.* What is the nature of the universe from which the sample will be taken? Define the universe whether it is finite or infinite. In finite population, the number of items is certain while in the infinite population; the number of items in it is infinite. E.g. the population of a city, the number of workers in a factory, and etc are examples of a finite population, where as the number of stars in the sky, listeners of a specific radio program, throwing of a dies and etc are the examples that explain an infinite population.
- ii. *Sampling unit.* The sampling unit is the individual population object or elements or a group of population object or element of sample. A sampling unit may be a geographical: state, district, village, etc; or a construction unit such as house, flat, etc, or it may be social unit such as family, club, school, etc, or it may be an individual.
- iii. *Source list.* This is also known as sampling frame. It contains the names of all items of a universe (in a finite population) from which a sample is drawn. If source list is not available, the researcher has to prepare it. The sampling frame has to be the representative of the population. Additionally, the source list should have the following qualities:
 - a) It should be exhaustive so as to include all items of the universe
 - b) It should be accurate and duly verified
 - c) It should contain all relevant information about the items, so that if strata are to be made, it should be possible to do so
 - d) No item should be repeated
 - e) The source list should be in terms of those units in which investigation is to be conducted. For example, for a study of families, this should be in terms of families, not in houses or persons
 - f) It should be reliable
 - g) It should be available to the investigator
- iv. *Size of the sample.* This is the number of the items to be selected from the universe to constitute a sample. It should be neither excessively large nor too small. It should be optimal. The size of the population should also be taken in to account as it limits the sample size. Budgetary constraints should also be taken in account. Detail discussions on the issues related to sample size are discussed in the new sub-title that follows.
- v. *Parameters of interest.* The specific population parameters including the population mean, proportion, or population standard deviation and/ or others of interest should be taken in to account.
- vi. *Budgetary constraints.* Such constraints have big impact both on the sample size and the sample type. This fact can even lead to the use of a non-probability sample.

- vii. *Sampling procedure.* Finally, the researcher has to be able to decide about the technique used to select the sample. In other words, this is all about the selection of the sampling design. It must be the one which has a smaller sampling error.

5.3. Sampling Techniques

Different types of sampling techniques are used for drawing a sample plan. The various methods of sampling may broadly be classified into two categories:-

- A. Probability sampling
- B. Non-probability sampling

A. Probability sampling

Probability sampling provides a scientific technique of drawing samples from population according to some laws of chance in which each unit has some definite pre-assigned probability of being chosen in the sample. Random sampling, systematic sampling, stratified sampling, cluster sampling, multi-stage sampling and area sampling are considered as probability sampling.

- 1) **Random Sampling:** - A random sampling is the one where each item in the universe has an equal or known opportunity of being selected. A random sample is a sample selected in such a way that every item in the population has an equal chance of being included. Random sampling is more suitable in more homogeneous and comparatively larger groups.

Selection of Random sample

Four methods are generally used for drawing out a sample on random basis. They are:-

- i. **Lottery Method:** Under this method, the various units of the universe are numbered on small and identical slips of paper, which are folded and mixed together in a drum thoroughly. A blindfold selection is then made of the number of slips required to constitute the desired size of sample.
- ii. **Use of table of random numbers:** The most practical and economical method of selecting a random sample consists of the use of table of random numbers. These tables have been constructed by L.H.G. Tippett (1927), Fisher and Yates (1963), Kendall and B. Smith (1939). These numbers are very widely used in all the sampling techniques and have proved to be quite reliable as regards to accuracy and representativeness. The procedure for a sample using a table of random numbers is as follows:
 - 1. Identify the total numbers of elements in the study population. It can have one or more digits .
 - 2. Number each element starting from 1.
 - 3. If the table of random numbers is in more than one page, choose the starting page by a random procedure. Select also the rows or columns by same procedure to determine your starting point and proceed in a predetermined direction (horizontally, vertically, or diagonally).

Table 5.1. A sample of random numbers

4.

104	092	273	125	233	476	352	501
373	054	320	148	405	764	489	947
084	142	226	289	153	419	364	650
092	001	590	625	729	709	837	667
121	080	479	599	970	180	015	573
660	506	057	747	217	434	107	327
312	106	301	508	705	945	257	418
851	626	897	976	702	502	305	162
633	057	233	721	635	805	932	154
734	379	264	357	553	703	652	296

Randomly select number of rows or columns, in a random table, corresponding to the number of digits of the population

5. Decide on your sample size

6. Select the required number of your sample. If same numbers are selected, discard it and go to the next.

Example: Suppose a random sample of 15 is to be selected from AMU population of 500 Management students. A table extracted from a standardized random table is illustrated as under. Here, you have to choose three columns or rows randomly (say column 1, 4, and 8 respectively). Starting at the top of the left first column, the selected elements (samples) include 104, 373, 84, 92, 121, 312, 125, 148, 289, 357, 327, 418, 162, 154, and 296.

iii. Grid system: This technique is used for selecting a sample of area. According to this method, a map of entire area is prepared. Then a screen with squares is placed upon the map and the areas falling within the selected squares are taken as samples.

iv. Coin Flipping method: If a small number of populations are considered, a coin may be flipped to select a sample by assigning head or tail to a unit. But you have to decide ahead of time whether the unit which gets a tail or head needs to be included in the sample.

Precaution in drawing a random sample

Following precautions may be observed in drawing a random sample:-

- Population to be sampled and the unit must be clearly defined

- Different units should be approximately of equal size
- The units must be independent of each other
- Method of selection should be completely independent
- Every unit should be accessible; units once selected should not be ignored or replaced by any other unit of the universe.

Merits of random sample method

This method has several advantages, which may be summarized as below:

It is more scientific method of taking out samples from the universe since its elements are free from personal bias

No advance knowledge of the characteristics of the population is necessary under this method

The sample drawn under this method is true representative of the universe

It is possible to ascertain the efficiency of the estimates by considering the standard errors of their sample distribution

It is very simple and easily practicable procedure of selecting sample

This method provides us most reliable and maximum information at the least cost which saves time, money and labor.

Demerits of Random Sample Method

Random sampling method has certain practical difficulties and inertness limitations, which are as follows.

The sampling method requires complete list of the universe. But such up-to-date list is not available in many enquiries which restrict the use of this method.

The sample may not be a true representative of the universe if its size is too small Sometimes this method gives such results whose probability is very small

For a given degree of accuracy, this method usually requires larger sample as compared to stratified sampling.

- 2) **Stratified Random Sampling:** Where the *population is heterogeneous* with respect to the variables or characteristics under study, then the technique of stratified sampling is used to obtain more efficient and accurate results. Stratification means division of the universe into non-overlapping groups according to geographical, sociological or economic characteristics.

Process of Stratifying

1. Stratified random sampling involves the following steps The universe is first divided in to sub-groups based on the principal variables under study (for example, based on age, income, attitude, etc) and the required units are selected at random from each sub-group
2. The stratification should be conducted in such a way that the items in one stratum should be similar to each other but they should differ significantly from units of other strata

3. Each and every unit in the population must belong to one and only one stratum. In other words, various strata must be non-overlapping
4. The size of each stratum in the universe must be large enough to provide selection of items on random basis
5. Size of the sample from each stratum can either be proportional or disproportional to the size of each stratum.

Categories of stratified sampling

a. Proportionate stratified sampling-This sampling involves drawing a sample from each stratum in proportion to the share of the stratum in the total population. For example, the second year BA students of Faculty of Business and Economics of Arba Minch University consist of the following specialization groups:

Table 5.2. Enrollment in Arba Minch University, 2009

Departments	Number of students	Proportion of each stream
Management	340	0.35
Accounting	300	0.31
Economics	320	0.33
	960	1.00

Suppose the researcher decides to take a sample of 150. Then the strata sample size will be:

Table 5.3. Sample from the total population of Enrollment in AMU, 2009

Strata	Sample size
Management	$0.35 \times 150 = 53$
Accounting	$0.31 \times 150 = 47$
Economics	$0.33 \times 150 = 50$
	150

b. Disproportionate stratified random sampling- This method does not give proportionate representation to strata. It gives overrepresentation to some and underrepresentation to others. All strata may be given equal weight even though their shares in the total population can vary.

Merits of stratified random sampling

This method has several advantages which may be summarized as below:-

- If a correct stratification has been made, even a small number of units will form a representative sample
- Under stratified random sampling, no significant group is left underrepresented
- Stratified random sampling is more precise and to a great extent avoids bias. It also saves time and cost of data collection since the sample size can be less in this method
- It is the only sampling plan which enables us to achieve different degrees of accuracy for different segments of the population. Replacement of case is easy in this method if the original case is not accessible to study. If a person refuses to cooperate with the investigator he may also be replaced by another person from the same sub-group.
- Stratification is of great advantage if the distribution of the universe is skewed.

Demerits of stratified random sampling

This method has some demerits which are listed below:-

- It is a very difficult task to divide the universe into homogeneous strata
- If the strata are over-lapping, unsuitable or disproportionate, the selection of samples may not be representative
- If stratification is faulty, the results obtained may be biased. Such errors cannot be compensated even by taking large samples

3) Systematic Sampling: Under this method, a sample is taken from a list prepared on a systematic arrangement either on the basis of alphabetic order or on house number or any other method. In this method, only the first sample unit is selected at random and the remaining units are automatically selected in a definite sequence at equal spacing from one another.

Steps involved in systematic sampling

1. First of all, the population is arranged in serial numbers from 1 to N, and the size of sample is determined
 2. The sample interval is determined by dividing the population by the size of sample
i.e. $N/n = K$
Where K = sample interval
N = Size of population
n = Sample size
 3. Any number is selected at random from the first sampling interval. The subsequent samples are selected at equal or regular intervals
-

Merits of Systematic Sampling

Systematic sampling is very easy to operate and checking can also be done quickly

Randomness and probability features are present in this method which makes sample representative.

Demerits of systematic sampling

Systematic sampling works well only if the complete and up-to-date frame is available and if the units are randomly arranged

Any hidden periodicity in the list will adversely affect the representatives of the sample

4) Cluster Sampling: This method is adopted when the population elements are scattered and large, and the list of the elements is not readily available. Under this method, the total population is divided into some recognizable subdivisions which are termed as clusters and a simple random sample of these clusters, as the sampling unit, is drawn and then the survey of each and every unit in the selected cluster is made. Unlike the stratified random sampling technique, there is heterogeneity within the subgroups (clusters) and homogeneity among the subgroups.

Suppose a researcher wants to select a random sample of 600 households out of 10,000 estimated households in one rural *Kebele* for survey. Here the list of the individuals may not exist and because of this it is difficult to select a direct sample of individual households. Instead, the researcher can select a random sample of a few villages/*Gotes*. If, for example, the average number of households per village/*Gotes* is 50, then 12 villages/*Gotes* comprise the sample. Since the number of households per block varies the actual sample size depends on the village which happens to be selected.

Principles of cluster sampling

The principles that are basic to the cluster sampling method are:

- Cluster should be as small as possible with the cost and limitations of the survey.
- The number of sampling units in each cluster should be approximately same

Merits of cluster sampling

This method provides significant cost gain

It is easier and more practical method which facilitates the field work

Demerits of cluster sampling

Probability and the representatives of the sample is sometimes affected if the number of the clusters is very large

The results obtained under this method are likely to be less accurate if the number of sampling units in each cluster are not approximately the same

Self check exercise

?

Hello learner! Suppose you want to estimate proportion of machine-parts in an inventory which is defective. Also assume that there are 20,000 machine parts in the inventory at a given point of time, stored in 400 cases of 50 each. How many clusters can be formed here?

5) Area sampling: If clusters happen to be some geographical sub-divisions (such as regions, *woredas*, *kebeles*, and etc), in that case cluster sampling is better known as area sampling. In other words, cluster designs, where the primary sampling unit represents a cluster of units based on geographical area, distinguished as area sampling. All points of cluster sampling are also applicable to *area sampling*.

6) Multi-Stage Sampling: Multi-stage sampling is a further development of the principle of cluster sampling. The method is generally used in selecting a sample from a very large area. As the name suggests, multi-stage sampling refers to a sampling technique which is carried out in two or more stages. Here the population is regarded as made of a number of first stage sampling units (e.g. regions), each of which is further composed of a number of second stage sampling units (e.g. zones) which is further composed of third stage sampling units (e.g. *woredas*) and so on till we ultimately reach the desired sampling unit in which we are interested. In each stage, the sampling units are clusters. At each stage, there is a *random selection* and the size of sample may be proportional or disproportional. Thus, the area of investigation is scientifically restricted to a small number of ultimate units which are representative of the whole.

Example: Suppose you want to investigate the opinion of merchants towards the “free market economy” in Ethiopia. You can draw the sample of merchants as follows. You can select a sample of four regions from the country. From the 4 regions, you should list all zones and you can select a random sample of 25 zones. From the 25 zones, you should list all *Woredas* and you can select 100 *Woredas* randomly as your sampling unit. From the 100 *Woredas*, you should list all merchants and you can randomly select 600 merchants to finally contact for survey.

Merits of Multi-stage sampling

Multi-stage sampling is more flexible in comparison to the other methods of sampling. It is simple to carry out and results in administrative convenience by allowing the field work to be concentrated in compact small areas and yet covering a large area

This technique is of great significance in surveys of underdeveloped areas where no up-to-date and accurate frame is generally available

It is reliable and satisfactory technique. Under this method surveys can be conducted with considerable speed

Demerits of multi-stage sampling

Errors are likely to be large in this method in comparison to any other method

It is usually less efficient than a suitable single stage sampling of the same

It involves considerable amount of listing of first stage units, second stage units etc. though complete listing of units may not be necessary

B. Non-probability sampling

Non-probability sampling or judgment sampling is based on the personal judgment. Under this method, a desired number of sample units are selected *deliberately or purposely* depending upon the object of the enquiry so that only the important items representing the true characteristics of the population are included in the sample. Purposive sampling, quota sampling and convenience sampling are considered as non-probability sampling.

- 1) **Purposive sampling:** This is also called “*deliberate sampling*” or *judgment sampling*”. When the researcher deliberately selects certain units for study from the universe, it is known as *purposive sampling*. Thus under this method, there is a deliberate selection of certain units on the judgment of the researcher and nothing is left to the chance. But it must be kept in mind that the units selected must be representative of the universe.

Merits of Purposive sampling

Under proper controls and safeguards, this method can prove very useful. It is more economical and less time consuming

This method ensures proper representation of a cross-section of various strata of the universe if the researcher has full knowledge of the composition of the universe

This method is very useful specially when some of the units are very important and their inclusion in the study is necessary

It is a practical method where randomization is not possible

Demerits of Purposive sampling

Under this method, considerable prior knowledge of the universe is necessary which in most cases is not possible

Control and safeguards adopted under this method are sometimes not effective and there is very possibility of the selection of biased samples

Under this method, the calculation of sample errors is not possible. Therefore, the hypothesis framed cannot be tested

- 2) **Quota Sampling:** This is a *special type of stratified sampling*. First of all, in this method, the population is stratified on some basis, preferably on the basis of the characteristics of the population under study. After this, the number of sample units to be selected from each stratum is decided by the researcher in advance (*i.e. selection within the strata is non-random*). This number is known as *quota*, which may be fixed according to some specific characteristics such as income groups, sex, occupation, political or religious affiliations, and etc. The choice of the

particular units for investigation is left to the investigators themselves. The investigators try to complete the quota assigned to them from each stratum. The investigators usually apply their judgments in the choice of the sample and try to get required information quickly. In case of non-response due to unco-operative nature of the respondents, the investigator selects some fresh units himself to complete his quota. To show a model of assignment given to an interviewer is shown below:

Table 5.4. Assignment of quota

Sex		Age		Social class	
Male	11	20-40	5	Higher	3
Female	9	41-50	8	Middle	10
Total	20	51-60	4	Lower	7
		61 and above	3	Total	20
		Total	20		

Merits of Quota sampling method

Quota sampling is the combination of stratified and purposive sampling and thus enjoys the benefits of both methods. It makes the best use of stratification economically. Thus, it is a practical as well as convenient method.

If proper controls or checks are imposed on the investigator, quota sampling is likely to give accurate results

It is useful method when no sample frame is available

Demerits of Quota Sampling

This method suffers from the limitations of both stratified and purposive sampling

Control over fieldwork is a very difficult task. Here, the results may be biased because of the personal beliefs and prejudices of the investigator in the selection of the units under study

Since quota sampling is not based on random sampling, the sampling, error as well as standard error can not be estimated

Since the samples are not randomly selected, the sample selected under this technique may not be true representative of the universe.

The bias may also occur due to substitution of unlike sample units.

3) **Convenience sampling:** It is known as unsystematic, careless, accidental or opportunistic sampling. Under this method, a sample is selected according to the convenience of the investigator. This convenience may be in respect of availability of data, accessibility of the units, etc. Moreover, the method is all about selecting whatever sampling units are available, e.g., a producer/seller may select the customer coming to his shop. This method may be used in the following cases:-

1. When the universe is not clearly defined
2. When sampling units are not clear

Thus the names may be selected from a Telephone Directory, Automobile Registration Records, Industrial or stock Exchange Directories and contracting any one who may have chance to be easily available etc.

4) **Snowball sampling:** This is a colorful name for technique of building up a *list* or a *sample of a special population* by using an *initial* set of its members *as informants*. For example, if you want to study the problems faced by Ethiopians living in some country, say, you may identify an initial group of Ethiopians through some source like Ethiopian Embassy. Then you can ask each one of them to supply names of other Ethiopians known to them, and continue until you get an exhaustive list from which you can draw a sample or make a census survey.

Merits of Snowball sampling

It is very useful in studying social groups, informal groups in a formal organization, and diffusion of information among professional of various kinds.

It is useful for smaller populations for which no frame is readily available

Demerits of Snowball sampling

It does not allow the use of the probability statistical method. Elements included are dependent on the subjective choice of the original selected respondents.

It is difficult to apply it when the population is very large It does not ensure the inclusion of all elements in the list.

5.4 Sample Size and sampling error

Sample size

This means the number of sampling units selected from the population for investigation. The size of sample is directly related to standards of accuracy, time, cost and administration of the investigation. The larger the size of sample, greater will be the representation of the items of the investigation or universe in it, but it brings difficulties of managing it. In large-sized samples, intensive study of the units becomes difficult. If the size of the sample it kept small, it will not represent the universe and the degree of accuracy in the results will be limited. Hence, *the size of a sample should be neither too big nor too small*. It should be “optimum”. An optimum sample survey is one which fulfills the requirements of efficiency, representativeness, reliability and flexibility. The size of the sample should ensure minimum of cost and minimum of standard error. A small sample will have a large standard error compared with a large sample of the same

characteristics, while the cost will be less in the first as compared to the latter. In determining the size of your sample, you have to be able to answer the following questions.

- At what level of confidence do you want to test your results, findings or hypotheses?
- With what degree of accuracy do you wish to estimate the population parameters?
- What is the estimated level of variation (standard deviation), with respect to the main variables you are studying, in the study population?

The size of the sample which is required in order to make a valid inference about a population is dependent upon several factors such as:-

1. **Homogeneity or heterogeneity of the universe:** - In a universe consisting of homogeneous units, a small sample is suitable, while in a universe consisting of heterogeneity units; a large sized sample is inevitable, for yielding good results.
2. **Number of classes proposed:** - If it is necessary to classify data in a large number of classes, a large size sample should be taken to facilitate analysis of the data. If the size of the sample is small and classes are many, then there will be some classes which may not get due representation in the sample. If the proposed number of classes is more, the size of the sample should be big.
3. **Nature of Study:**-Nature of study also affects the size of a sample. For an intensive and continuous study, small sample will be suitable because such study in large-sized sample will require more resources. For general survey, the size of the sample should be larger, but for technical studies the size of the sample may be kept small.
4. **Practical Considerations:** - The availability of finance, time and trained personnel are other practical considerations which affect the size of the sample
5. **Standard of accuracy:** - Though it is believed that larger is the size of the sample, great will be the degree of accuracy, yet this is not always so. If a sample is selected by experts through scientific method, a small sample can produce more accurate results.
6. **Type of Sampling:** - In random sampling, greater accuracy in results will be achieved only in a large sample. In a properly drawn stratified sampling, a small sample can give better results.
7. **Nature of units:** - where it is expected that a large number of units will not respond, and then a large sample should be taken.
8. **Size of questionnaire:** - If the size of the questionnaire is large and it contains difficult questions, the size of the sample should be kept small.

Moreover, when deciding upon sample size, the researcher must note the following points:-

1. **The size of the population to be sampled:** - Even if it is difficult to make general rules with out the knowledge of the population, researchers recommend that a sample size of around 30 cases seems to be the bare minimum for studies which require statistical data analysis and which do not involve many sub divisions of data. Although some studies (like laboratory experiments, qualitative studies, etc) use fewer than 30 cases, experienced researchers advise sample of 100 or more.

2. ***The actual number of cases from which data are collected:*** - In some instances, the data actually gathered might be substantially fewer because of respondents who can not be located, refuse to be interviewed, or return illegible questionnaires. Furthermore, the actual number of cases varies from question to question depending on the percentage of respondents who fail to answer each particular question. For example, respondents who are in hurry to complete the questionnaire may inadvertently omit some items. Other respondents may deliberately leave blank questions that they feel are an invasion of privacy. A question that requires much thought before it can be answered properly may also be left unanswered. Other questions may be ambiguous or have unclear answer categories, causing respondents to refuse to answer. Moreover, some questions are not applicable to all respondents, then lowering the sample size for that question.
3. ***The number of cells the sample may have to be subdivided during data analysis:***
Every researcher is required to estimate the number of cells in which the sample has to be shared during data analysis of variables and ensure an adequate sample size for each subdivision. The cross tabulation analysis of variables requires the following criteria to be met with:
- Each category of an independent variable included in a cross tabulation should contain at least 50 cases, for percentage calculated on the basis of fewer than 50 cases tend to be unreliable. The minimum sample size required to ensure at least 50 cases in each category of the independent variable is obtained by dividing 50 by the proportions(P_s) of total cases you expect in the smallest category of the variables, i.e., $n=50/P_s$.
 - The expected number of cases in each cell of a table should be at least five. The sample required to ensure a minimum expected cell size of five is obtained by dividing five by the product of the proportions falling in the smallest categories of the variables in the cross tabulation table.

To illustrate those points, consider the sample size required in analyzing a cross tabulation of advertisement-sensitivity of customers and their educational attainment.

Table5.5. Sample size determination in a cross tabulation (advertisement-sensitivity and educational attainment of customers)

Advertisement	Educational attainment			
	College (5%)	Secondary school (15%)	Primary school (40%)	No schooling (40%)
Highly sensitive (40%)				
Poorly sensitive (35%)				
Not sensitive (25%)				

In this particular example, education is considered as the independent variable. Therefore, in order to have a sample large enough to ensure that at least 50 cases will fall in to the smallest category of the variable “educational attainment” (i.e. in to the category of “College” which accounts for only 5% of the total number of cases)), we need to divide 50 by 5% (i.e., $n=50/P_s= 50/.05=1000$ cases required).

To find the minimum sample size needed to ensure an expected cell frequency of at least five, we must divide 5 by the product of the proportions falling in the smallest categories of the two variables (0.05 for the “College” and 0.25 for “No sensitive”) so that the number of cases will be 500, i.e. $n= 5/(0.05 \times 0.25)= 500$ cases.

4. **Degree of accuracy that is needed for the study:** - If you seek a higher degree of accuracy (such as 0.01), your sample will need to be much larger than if you seek a relatively low degree of accuracy (such as 0.05). You can calculate the sample size needed to measure a given proposition with a given degree of accuracy at a given level of statistical significance by using a simple formula, provided that the total population size is greater than 10,000.

$$n = (z \times p \times q) / (d^2)$$

where:

n=the desired sample size (when population greater than 10,000)

z=the standard normal deviate, usually set at 1.96 (or simply 2.0), which corresponds to the 95% confidence interval

d=degree of accuracy desired, usually set at 0.05 or occasionally at 0.01.

p=the proportion in the target population estimated to have a particular characteristic.

q= N-p

For example, if the proportion of a target population with a certain characteristic is 0.50, the Z-statistic is 1.96, and the desired accuracy at the 0.05 level, then the sample size is

$$n = zpq/d^2 = (1.96) (0.5) (0.5) / (0.05^2) = 384$$

Note that if N (the entire population size) is less than 10,000, the required sample size will be smaller. In such cases, calculate a final sample estimate (nf) by using the following formula.

$nf = n / (1 + (n/N))$ where

nf=the desired sample size (when the population is *less than* 10,000)

n= the desired sample size (when the population is *greater than* 10,000)

N= the estimate of the population size.

9. Characteristics of a good sampling design

- ✚ Sample design must result in a truly representative sample
- ✚ Sample design must be the one which results in a small sampling error
- ✚ Sample design must be viable in the context of funds available for the research study
- ✚ Sample design must be the one in which systematic bias can be controlled in a better way
- ✚ Sample design should be such that the results of the sample study can be applied, in general, for the universe with a reasonable level of confidence.

10. Sampling and Non-Sampling Errors

In the study of sample surveys, it is necessary to keep in mind sampling and non-sampling errors. Since a sample survey implies the study of small proportion of the total universe/population and drawing inference about the population, there would naturally be a certain amount of inaccuracy or errors.

Let us now see the two types of errors in the following par I and II as follows.

I. Sampling Errors

These are the errors created because of chance only. The errors occur because only a partial observation of the universe is made. If a census is taken, sampling errors could be expected to disappear. Thus, *the difference between a sample result (sample statistic such as sample mean and standard deviation) and the result of a complete census (parameter such as population mean and standard deviation) taken under the same circumstances is called sampling error. It is thus the measure of the divergence between statistic and the parameter values (i.e., Sampling error = statistic-parameter).* Thus, such errors reveal themselves in a partial distortion of the statistical derivations such as mean, standard deviation or correlation based on sample observations from those based on complete enumeration.

Sampling error can be measured for a given sample design and size as above. The measurement of a sampling error is also referred to by the term precision of sample plan/ results. The difference is also called the accuracy of the sample result. If we can increase the sample size, the precision of the sample result can be improved. However, it should be noticed that increasing the sample size does have its own limitations (in terms of cost and surfacing of the sampling bias).

The errors which arise due to the use of sampling surveys are known as the sampling errors. Thus, if two or more samples are taken and further if the required information is collected without any mistake, whatsoever, the results obtained from the samples would usually differ to some extent as compared to one obtained from a complete enumeration. These differences constitute the errors due to sampling. For example, the mean of the sample may be different from the population mean by *chance alone*. In other words, even when a sample is random one, it may not be exactly representative of the population from which it is chosen. Samples may be taken from the same population four times. All samples may not be alike. This also gives rise to sampling errors. Thus they are due to the fact that samples are used and to the particular method used in selecting the items from the population. The sampling error decreases with the increase in the size of the sample, and it happens to be a smaller magnitude in case of homogeneous population. If the size of the sample is large, there would be the tendency of the movements to neutralize one another making the data more stable and thus more reliable. Such error is, therefore, also known as non-cumulative or compensating error as distinguished from biased errors or non-compensating or cumulative errors.

Example: Suppose an individual student has scored the following grades in 6 subjects: 70, 75, 80, 85, 90, and 95. If three samples are selected at random (say 75, 85 and 90), the mean of this sample will be $(75 + 85 + 90) / (3) = 83.3$. The mean of another three randomly selected sample (say 80, 85, and 90) will be $(80 + 85 + 90) / (3) = 85$. But the mean of the population is computed to be 82.5, i.e., $[(70 + 75 + 80 + 85 + 90 + 95) / (6)] = 82.5$. From these, we can observe the sampling errors of 0.8 (i.e., $83.3 - 82.5$) and 2.5 (i.e., $85 - 82.5$).

II. Non-sampling Error (Systematic Bias)

Systematic bias results from errors in the sampling procedures, and it *can not be reduced or eliminated by increasing the sample size*. Rather, the causes for these errors can be detected and corrected. Such error occurs because of the human mistakes and not by chance.

Non-sampling errors include bias and mistakes at the stages of ascertainment and processing of data, i.e., clerical errors, computation of errors, or an incorrect answer to an unclear question. Naturally, this type of error can occur in any survey, whether it is a complete enumeration or sampling. The bias/sampling error can be **caused** by the following factors.

- i. **Faulty Selection of the Sample:-** Faulty selection of the sample may give rise to bias in a number of ways, such as:-
 - a. *Purposive Sampling:* - Purposive and/or deliberate sampling method may be adopted in place of a simple random sampling method. As a result of such subjective selection, some errors are bound to arise, and they are known as biased errors. Such errors are also known as *cumulative errors or non-compensating errors*. Errors due to bias increase with an increase in the size of the sample. Moreover, the investigator's desire or motive to obtain a certain result from the sample survey may influence his/her selection of the sample, consciously or unconsciously.
 - b. If the selection of the sample is *haphazard*, the chance of bias error is great.
 - c. *Substitution:* That is, substitution of the selected item in the sample by another. Due to non-availability of the person chosen in the sample, another may be interviewed, who may not have the same characteristics as the original one. This will introduce substitution bias in the sample and invalidate the result of the enquiry.
 - d. *Incomplete investigation or non-response*, i.e. Failure to cover the whole of the sample. If the selected person is not visited for the first or for the second time, or, if necessary, the third time, to elicit information, bias may arise.
 - e. *An appeal to the vanity of the person interviewed* may give rise to yet another kind of bias. For example, the question, 'have you read that book?' is such that most of the students would succumb to vanity and answer 'yes'.

Example on inappropriate sampling: Suppose a researcher plans to conduct his study on the attitude of adults towards education in Ethiopia. If a certain political party membership lists are used as sampling frame, the sample to be selected can not represent the general adult population in Ethiopia, as it has been selected from a biased source.

- ii. **Bias due to faulty collection of data:** During the process of collecting the actual information in a survey (whether sample or census), certain inaccuracies and mistakes may creep in. These may arise due to the following reasons:-
- Negligence or prejudice of the person collecting information either in asking the questions or in recording the answers
 - Negligence or prejudice or lack of knowledge or forgetfulness on the part of the person furnishing information
 - Poorly designed questionnaire
 - Unorganized collection procedure, faulty editing or coding of response
- The danger of such error is, however, likely to be greater in sampling work, since the units measured are often smaller.
- iii. **Accessibility bias:** -In a considerable number of research studies, researchers tend to select respondents who are most accessible to them. This can create bias.
- iv. **Defective measuring device:** - In case, for example, the questions are not well phrased; they can not be fully understandable by the respondents. Accordingly, the answers obtained can not be accurate. Moreover, some items can be miss-measured due to the errors in the procedures of observation, interviewing, coding and etc.

Example: If a test is conducted on a sample of students for general mental ability, and if the researcher unintentionally allows an extra time of 5 minutes for the test, there will probably be a systematic tendency for the sample statistic to be higher than it should be, therefore, there will be a bias in the measurement of mental ability.

v. **Bias in Analysis:** Faulty methods of analysis of data may also introduce bias. Now let us see the mechanisms how to avoid a bias.



Avoidance of bias

If possibilities of bias exist, the conclusions drawn from the sample cannot be regarded as fully objective. The first essential of any sampling or census procedure must, therefore, be the elimination of all sources of bias. To avoid bias in the selection process is to draw the sample either entirely at random. However, in certain cases systematic sampling may be adopted.

Bias arising from substitution should not be allowed to enter the survey. The survey once selected should be strictly adhered to throughout the enquiry. The investigator should try to investigate the entire sample.

Bias arising from faulty collection of data may be removed in a number of ways. For instance, the information relating to age, income, language etc may be wrongly entered either by the respondent or by the enumerator. The statistician should be able to corroborate such information to put a check on such wrong reporting.

Chapter Summary

Dear learner! Now let us summarize what you have already gone through in chapter five. In this chapter, you learnt about sampling design and sampling design. Sample refers to part of a population from which you obtain the information about the population. But population implies the aggregate number of the units pertaining to a study.

Broadly, speaking, sampling technique is divided in to two: Probability sampling and non-probability sampling techniques. Under probability sampling technique, each unit of a sample has some definite pre-assigned probability of being chosen in the sample. But in non-probability sampling technique, a desired number of sample units are selected deliberately or purposely to incorporate only the important items representing the true characteristics of the population.

The probability sampling technique can take on different categories such as random sampling, stratified random sampling, systematic sampling, cluster sampling, area sampling, and multi-stage sampling techniques. In non-probability sampling; purposive sampling, quota sampling, convenience sampling, and snowball sampling techniques are employed. However, in the study of sample surveys, sampling and non-sampling errors can possibly surface. Sampling errors are created because of chance only. However, in systematic bias errors result from such factors as human mistakes including faulty selection of the sample, faulty collection of data , accessibility of bias, using defective measuring device, bias arising in analysis.

The sampling error can be reduced by increasing the size of the sample. However, the non-sampling error can not be reduced or eliminated by increasing the sample size. Rather, such techniques as selection of the sample at random, investigating the sample in its entirety, and checking for wrong reporting can be employed.

Chapter review questions**Choose the BEST answer from the alternatives**

1. Identify method of sampling which does not have a probability for respondents to be selected as a sample.
 - A. Random sampling
 - B. Systematic sampling
 - C. Stratified sampling
 - D. Cluster sampling
 - E. None
2. which one is correct about sampling error
 - A. Sampling error decreases with the increase in the size of the sample.
 - B. Sampling error increase with the increase in the size of the sample
 - C. The error is small when the population is homogeneous
 - D. A & C
3. Identify the wrong statement about non sampling error
 - A. Emanates from errors in sampling procedure
 - B. Can be reduced by increasing the sample size
 - C. Result from defective measurement instrument
 - D. All
4. Involves dividing the total population into homogeneous subgroups.
 - A. Simple random sampling
 - B. Systematic sampling
 - C. Stratified sampling
 - D. Convenience sampling
5. Acquiring and identifying sample units are sometimes difficult. In such cases what do you think as a possible sampling technique?
 - A. Using convenience sampling
 - B. Using judgmental sampling
 - C. Using snowball sampling
 - D. Using purposive sampling
 - E. All
6. Which one true about Sampling frame
 - A. It is a study of relationships existing between a population and samples drawn from the population.
 - B. It is the relationship between a parameter and a statistic.
 - C. It is concerned with estimating the properties of the population from those of the sample.
 - D. It is listing of the accessible population from which you'll draw your sample
 - E. None
7. Which one of the following is not true about probability sampling?
 - A. The probability or chance of every unit in the population being included in the sample is known.
 - B. Selection of the specific units in the population depends entirely on chance.

- C. Different units in a population have equal probabilities of being chosen.
 - D. It is sampling technique that does not involve random selection
 - E. None
8. Which one is false about Accidental sampling?
- A. The universe is not clearly defined
 - B. Sampling unit is not clear
 - C. A complete source list is not available
 - D. It is a case in “Man on the street”
 - E. None

CHAPTER SIX

SOURCES AND METHODS OF DATA COLLECTION

Introduction

Dear learner! In the preceding chapter, you learnt about sampling and sampling design. The next activity in the research process is data collection and methods. Accordingly, in this particular chapter, you will learn about data types and the rationale for each, preliminaries to data collection, sources of data, and finally the methods of data collection with their pros and cons will be dealt in-depth.

- Collection of data refers to a purposive gathering of information relevant to the subject matter of the study from the units under investigation.
- Data are of two types: primary and secondary data. Primary data are original observations collected by a researcher for the first time for any investigation and used by him/her in the statistical analysis whereas secondary data are collected by others and used by others. The difference between primary and secondary data is only the degree of detachment with the original source. The data, which are primary one time, may be secondary at another. Once the primary data have been used, it loses its original character and becomes secondary. Such secondary data are mostly published in newspapers, periodicals and journals.

Chapter outline

- 6.1. Primary source and method of collecting data
- 6.2. Secondary source of data

6.1. Primary source and method of collecting data

Primary data are original observations collected by the researcher or his agents for the first time. It gives first-hand information.

Advantages of Primary Data

- a. Greater details.
- b. More accurate.
- c. As it involves definitions of terms and units used, it enhances the investigators' understanding of the meaning of units in which data are recorded.
- d. It indicates schedule, the procedure used in selecting the sample and size of the sample.

The choice between primary and secondary data mainly depends up on the nature, objectives and scope of inquiry, availability of time and money, degree of accuracy desired and the status of the investigator. The primary data are more reliable in the face, but the secondary data can be relied only by examining the source from which they have been obtained, their true significance, completeness and methods of collection. Sometimes in a certain investigation, both primary and secondary data are used as supplement to one another. It may be pointed out that, today, in a large number of statistical inquires secondary data are generally used because fairly reliable published data on a large number of diverse fields are now available. In fact, primary data are collected only if there do not exist any secondary data suited to the investigation under study.

The following points are noteworthy for the preference of primary source in comparison to the secondary source.

1. The primary source gives data in greater details compared to secondary source. The secondary source often omits part of the information.
2. In the secondary source, there is possibility of mistakes due to errors in transcription made then the figures were copied from the primary source.
3. The primary source includes definitions of terms and units used. It is essential that the investigator understands the meaning of units in which data are recorded.
4. The primary source also includes a copy of the schedule used in data collection together with the prescription of the procedure used in selecting the sample and the size of the sample.
5. The availability of finance also influences the method to be adopted in the collection of data. For example, research scholars mostly depend upon secondary data due to shortage of money.
6. The availability of trained investigators also affects the choice of the method to be employed in data collection. If trained investigators are available, primary method should be adopted for the collection of data. In case of non-availability of trained investigators, it is recommended to adopt secondary method of data collection.
7. The objective and the scope of the enquiry also determine the method to be adopted in the collection of data. The secondary method must suit the objective and the scope of the enquiry.

Methods of Collecting Primary Data

When the preliminary stages relating to a statistical inquiry have been satisfactorily arranged and the sources of data are listed, the next stage is the actual collection of the data. The choice of the primary data collection method depends upon the purpose of the study, the resources available and the skill of the researcher. The socio-economic-demographic characteristics of the study population play an important role in selecting the method of data collection. Whatsoever method is used, the way the purpose of the study is explained to the respondents also determines the quality of the data collected.

The following methods of collecting primary data can be distinguished:-

I. Observation

Observation is a purposeful, systematic, and selective way of watching and listing to an interaction or phenomenon as it takes place. There are many situations in which observation is the most important tool of data collection. For example, when you want to learn about the interaction in a group, study of dietary patterns of a population, ascertain the functions performed by a worker, or study the behavior or personality traits than the perception of an individual. When we can not elicit accurate information through questioning because the respondents may not co-operate or because they are unaware of the answer, observation method is still important. Or when subjects are so involved in the interaction that they are unable to provide objective information about it, observation is the best approach to collect the required information.

Types of Observation

There are two types of observation:

- Participant observation, and
- Non-participant observation

Participant observation is when a researcher participates in the activities of the group being observed in the same manner as its members, with or without their knowing that they are being observed.

Example: Suppose you want to examine the reactions of the general population towards people in wheel chairs. To study their reactions, you can sit in a wheel chair yourself.

Or else, if you want to study the life of prisoners, pretend to be a prisoner to observe.

Non-participant observation, on the other hand, is when the researcher does not get involved in the activities of the group but remains a passive observer, watching and listing to its activities and drawing conclusions from this.

Example: If you want to investigate the functions carried out by nurses in a hospital; you have to thoroughly watch, follow, and record the activities as they are carried out. Ultimately, you can reach a certain conclusion regarding the functions.

Problems with using observation as a method of data collection

- When the groups or individual become aware that they are being observed, they may change their behavior either positively or negatively. The change in the behavior of the individuals or groups because they recognized that they are being observed it is known as the Hawthorne Effect. In this situation, what is observed does not represent their normal behavior.
- There is always the possibility of the observer bias.
- The interpretations drawn from observations may vary from observer to observer.
- There is a chance of incomplete observation and/or recording, which varies with the method of recording. An observer may devotedly watch but at the expense of detailed recording or the vice versa.

Situations in which observations can be made

Observations can be made under two conditions:

- a. Natural, and
- b. Controlled

Observing a group in its natural operation rather than intervening in its activities is classified as observation under natural conditions. Introducing a stimulus to the group for it to react to and observing the reactions is called controlled observation.

The Recording of Observation

There are many ways of recording observation, the selection of which depends upon the purpose of the observation, the complexity of the interaction and the type of population being observed. The methods of recording used include the following:

a. **Narrative:-**In this method, the observer records the description of the interaction in his/her words. Usually, he/she makes brief notes while observing and then makes detail notes soon after the observation. Besides, some researchers may interpret the interactions and arrive at a certain conclusion.

Advantage of narrative method: - It provides a deeper insight in to the interaction.

Disadvantage of narrative method:-

- An observer may be biased in his/her observation. As a result, the interpretations and the conclusions drawn will be biased.
- If his/her attention is on observation, a part of recording may be missed and when recording a part of the interaction may be missed.
- With different observers, the comparability of narrative recording can be a problem.

b. **Scales:-**Some observers may prefer to develop a scale in order to rate various aspects of the interaction or phenomenon. The recording is done on the scale. The scale can have many directions depending on the purpose of the observation.

Problems/disadvantages of Scales:

- it does not give detail information about the interaction
- The observer may avoid the extreme positions on the scale, using mostly the central part. The error this tendency creates is termed as error of central tendency.
- Some observers may prefer certain sections of the scale in recording the interaction. This phenomenon is known as the elevation effect.
- When the way an observer rates an individual on one aspect of the interaction influences the way he/she rates that individual on another aspect of the interaction, an error is introduced. This type of effect is called halo effect.

Illustration: For more understanding of the method, look at the following figure in which the scale is designed to record the nature of interaction with in a group. (Here, there are three directions: positive, negative, and neutral).

c. **Categorical recording:** sometimes an observer may decide to use categories to record his/her observations. For example: passive/active (two categories); introvert/extrovert (two categories); always/sometimes/never (three categories); strongly agree/agree/uncertain/disagree/strongly disagree (five categories).

Disadvantage:-the method has the same problem as those associated with scales. d.

Recording on Mechanical devices: - This includes use of video and audio tapes.

Advantage: - the observer can see the interaction in a number of times before drawing any conclusion and even can invite other professional to reach a more objective conclusion. Disadvantage: Some may feel uncomfortable or may behave differently before a camera. So the interaction may not be a true reflection of the situation.

II. Interview

Interviewing is a commonly used method of collecting data through communication or interaction in which the subject or interviewee gives the needed data verbally in a face-to-face situation or through telephone calls.

Interview Designs

i. **Structured Interview:** - A structured interview is one in which the procedure to be followed is standardized and is determined in advance of interview. It involves the use of a set of predetermined questions and of highly standardized recording techniques. In other words, in this method of data collection, the same types of questions are presented in the same order to each interviewee, and wording of instructions to the interviewees is specified. The interviewer has no freedom to rephrase questions, and extra ones, or change the order in which the questions have to be presented. Thus, the interviews in a structured interview follows a rigid procedure laid down, asking questions in a form and order prescribed.

ii. **Unstructured Interview:** - This is characterized by a flexibility of approach to questioning. Although the series of questions to be asked and the procedure to be followed are decided upon beforehand, the interviewer is largely free to arrange the form, order and timing of the questions. He can thus rephrase the questions, modify them, and add some new questions to his list. But this sort of flexibility results in lack of comparability of one interview with another and the analysis of the unstructured responses becomes much more difficult and time consuming than that of the structured responses obtained in case of structured interviews. The unstructured interview also demands deep knowledge/skill of the interviewer. Unstructured interviews are usually labeled as “focused”, “depth”, and “non-directive”. The focused interview aims at some particular event or experience rather than on general lines of inquiry about an event. The depth interview is searching and giving emphasis to psychological and social factors. The non-directive interview permits much freedom to the interviewees to talk about the problem under investigation.

Unstructured interview is found to be very important technique of data collection in case of exploratory/formulative studies. But in case of descriptive studies, we quite often use structured interview technique because of its being economical, providing a safe basis for generalization and requiring relatively less skill (knowledge) on the part of the interviewer.

Methods of Interview

The main techniques of interview are as follows:

- i. Personal Interviews
- ii. Telephone Surveys

i. Personal Interviews

An interview is called personal when the interviewer asks the questions face-to-face with the interviewee. It is a two way communication initiated by an interviewer to obtain data from the respondent. The respondent is asked to provide information with little hope of any immediate or direct benefit from this co-operation. Personal interviews can take place in the home, at a shopping mall, on the street, outside a movie theater or polling place, and so on.

Advantages: high in-depth and detail information, the interviewer has more control, they can set up control question, and the interviewer can make adjustment (i.e., flexibility) to the language of the interviewee.

Limitations: costly both in terms of time and money, biases in the form of sampling, non response and response errors may creep into the process.

ii. Telephone Interviews

This method is a non-personal method used to collect data by contacting respondents on telephone. Though it is not widely used, it plays important part in industrial surveys, especially in developed nations.

Advantages:

- Moderate cost i.e., cost in administration and travel can be minimized.
- Faster completion of the study
- Responses can be directly entered to the computer
- Fewer interviewer biases.
- Respondents not willing to reveal their identity would be encouraged with this method.

Disadvantages:

Respondents must be having a telephone facility, the length of interview is short or limited, the adjustments and advantages which are available with the face to face kind of interview is lacking in this method.

Techniques of Interviewing

The techniques include preparation for interview, interview conduction, and data recording.

i. **Preparation for Interview:** - It is quite necessary to plan for the interview carefully to make it effective. Preparation focuses on recruitment of interviewers, the type of data collected, and the procedures used for data collection. Large gaps (in terms of social or physical characteristics) between an interviewer and interviewee can adversely affect the quality of data collected. Therefore, as much as possible, the interviewers need to be from the same tribe or race, of equivalent age, sex, and of the same social status as that of the respondents. They should also dress neutrally so as not bias the respondents' answers and dress unobtrusively so that the respondents' emphasis will be on the interview rather than the interviewers' appearance.

It is also advisable to try out the interview on another person before using it for actual study to reveal the deficiencies that should be corrected before the actual interview.

ii. **Conducting the interview:** - During the execution of the interview, a harmonious relationship between the interviewer and the interviewee is essential as a good rapport helps the interviewee to feel at ease and express him/herself willingly and freely. To establish a good rapport, an interviewer should note the following rules:-

- Tell the respondent who the respondent is and whom s/he represents, including showing the identification card or letters of assignment.
- Tell the respondent what the interviewer is doing, and what the study is about to stimulate his/her interest.
- Tell how the respondent was chosen, ensuring that he/she was not chosen personally for harassment or intimidation but was chosen in impersonal way merely because a cross section of the population is needed.
- Use a positive approach. Assume that the respondent will not be too busy for the interview. Say, "I would like to come in and talk with you about this" rather than, "May I come in?" or "Should I come back later?" or "Do you have time now?" or any other approach that gives the respondent a chance to say no.
- Ask non-threatening questions at the beginning -
Ask only one question at a time
- Repeat a question if necessary

- Try to make sure that the subject understands the question
- Listen carefully to the subject's answer
- Observe the subject's facial expressions, gestures, and tone of voice
- Allow the subject sufficient time to answer the question, but do not let the interview drag
- Avoid suggesting answers to the questions
- Do not show signs of surprise, shock, anger, or other emotions if unexpected answers are given.
- Have neutral attitude with respect to controversial issues during the interview process.
- Take note of answers that seem to be vague, ambiguous, or evasive and ask for their clarification (if necessary).
- In unstructured interview, ask additional questions to follow up clues or to obtain additional information
- Use tact and skill in getting the subject back to an area of inquiry when he has stayed too far from the original question. You must wind up the interview before the respondent becomes tired.

iv. **Recording of the interview:-**In this case, the interviewer may make use of a schedule, a structured format, rating scale, or a tape recorder to record the responses of the interviewee. The use of tape recorder during the conduct of the interview eliminates the omissions, distortions, elaborations and other modifications of data usually found in written interview, and it provides an objective basis for evaluating the adequacy of the interview data in relation to the performances of the interviewer. It also allows the interviewer to devote his attention to the interviewee and to save his time utilized for recording during and after the interview. The conscious and unconscious selection of the interview data by the researcher can also be avoided by using tape recording mechanism. If tape-recorder is not available, the interviewer can use note taking.

III. Questionnaire

A questionnaire is a written list of questions, the answers to which are recorded by respondents. In a questionnaire, the respondents read the questions, interpret what is expected and write down the answers. The only difference between a questionnaire and an interview schedule is that it is the interviewer who asks questions (and if necessary, explains it), and records the respondents' responses on an interview schedule. But in the case of a questionnaire, no one explains the meaning of the questions to respondents. So it is important that the questions should be clear and understandable. The layout of a questionnaire has to be easy to read and attractive to the eye and the sequence of questions should be easy to follow. It has to be developed in an interactive style, i.e., the respondents should feel as if some one is talking to them. A sensitive question or a question the respondents feel hesitant about answering should be prefaced by an interactive statement explaining the relevance of the question. Use of a different font for such statements is also advisable.

Methods of Administration and Data Collection through Questionnaire

1. **Mailed questionnaire** to be filled in by the respondent: - The collection of data through mailed questionnaire is one of the most popular methods used these days. A questionnaire contains many questions pertaining to the field of inquiry and provides space for answers. It is sent to the informant by post. The informant sends back the questionnaire duly filled in within the stipulated time mentioned in the covering letter sent with the questionnaire.

Advantages of Mailed questionnaire

- Mail surveys are among the least expensive.
- Persons who might otherwise be inaccessible can be contacted
- The questionnaire can include pictures to add value.
- Mail surveys allow the respondent to answer at their leisure. For this reason, they are not considered as invasive as other kinds of interviews.

Disadvantages of Mailed questionnaire:

- This method is used if you have the names and addresses of the target population
- Respondents can take more time to collect facts.
- Non-response error is expected
- Large amount of information may not be acquired.
- This method has the least response rate. For example, in populations of lower educational and literacy levels, response rates to mail surveys are often too small to be useful. Even in well-educated populations, response rates vary from as low as 3% up to 90%. But as a rule of thumb, the best response levels are achieved from highly-educated people and people with a particular interest in the subject (which, depending on your target population, could lead to a biased sample).

2. **Questionnaires in charge of enumerators**:- Sometimes the questionnaire is filled by the enumerator or the interviewer in which case it is known as schedule. In the case of a schedule, the enumerator fills the answers to the questions asked by him/her. This eliminates to a large extent the problem of non-response present in the case of mailed questionnaire method.

3. **Collective administration**: This method involves obtaining a captive audience such as students in a class room, people attending a meeting, participants of a program, etc. As you have personal contact with the group/gathering, you can explain the purpose of the study, its relevance and importance, and can clarify the questions that respondents may have. Also, there will be high response rate with the method.

3. **Administration in a public place including** shopping center, health center, hospital, school, or pub. Apart from being time consuming, this method has same advantage with collective administration method.

Designing a questionnaire

There is no one generally accepted method for designing a questionnaire. Various research texts suggest procedures ranging from 4 to 14 sequential steps. Questionnaire design, no matter how formalized, requires a measure of art with a good dose of humility. In designing a questionnaire, presumption must be set aside. Although for simplicity of format, the sequence for developing a questionnaire is given on a step-by-step basis rarely is a questionnaire constructed in such a routine way. Quite often it is necessary to skip from one step to another and to look back through a previous series of steps. The following steps represent a sequential procedure that need to be considered for the development of an effective questionnaire.

1. Determine the specific information needed to achieve the research objectives.
2. Identify the sources of the required information
3. Choose the method of administration that suits the data required and sources
4. Determine the types of questions to be used and form of response.
5. Develop the specific questions to be asked
6. Determine the sequence of the questions and the length of the questionnaire
7. Predetermine coding
8. Pretest the questionnaire.
9. Review and revise the questionnaire.

A brief discussion of each of the questionnaire development steps is made as follows:

Step1. Determine the specific information needed

This is the initial step required to determine the specific information needed to achieve the research objectives – which would answer the research questions and test the hypothesis. One of the most common and costly errors of research is the omission of an important question on the data gathering instrument. Once the questionnaire is filled, it is too late to go back for additional data without significant delay and additional cost. The researcher must determine all of the information required before the questionnaire is developed. Sometimes the articulation of research objectives into specific questions by setting up dummy tables to be used when analyzing the results will trigger a new idea of research question that should be included in the survey. Every effort needs to be marshaled at this point of the design process to ensure relevant results for the analysis phase of the research process. In some cases, it is advisable to conduct exploratory research to ensure that all of the relevant variables are identified.

In short, first clear definition and individual listing of all the specific objectives, research questions, or hypothesis to be tested should be made. To answer each list, associated questions need to be listed.

Step 2. Identify the sources

This step involves the important aspect of identifying the sources of the information needed determined in step one. The sophistication, intelligence, frame of reference, location, ethnic background, and other characteristics of the potential respondents are vital to determine the

type of questionnaire, the wording of questions, the means of administration, and other aspects of the questionnaire. E.g. Consider the difference in the design of a questionnaire if the questions are asked for ten-year old children or twenty-year old College students.

Step 3. Choose the method of administration

In this step, the decision is made on whether to use a method of personal interview, telephone survey, or mail questionnaire. Issues such as whether a stimulus is required, the length of the questionnaire, the complexity of the questions, and the nature of the issue being researched must be considered in choosing which type of survey is best. These decisions should be made with respect to the information required and the nature of the sources of the information. Other considerations that affect this decision are the cost and time constraints placed on the research project. Step 4. **Determine the type of questions**

To decide up on the type of questions used, a researcher must look both backward and forward. The researcher looks back to review the information required and the nature of the respondents. The researcher must look forward to the analysis stage of the research process to ensure that the right form of data is obtained to accommodate the proper analytical techniques.

There are two basic types/forms of questions that can be used in a questionnaire:

- a. Open-ended,
- b. Closed-ended
 - Dichotomous,
 - Multi-chotomous, and
 - Scales.

Most questionnaires have more than one type of questions.

a. **Open-ended questions:** open-ended (unstructured free response) questions such as "What did you like about the product?" or "What is your favorite television program?" provides an unlimited range of replies the respondent can make.

Advantages of Open-ended questions

- Permit an unlimited number of possible answers.
- Respondents can answer in detail and can qualify and clarify responses
- Unanticipated findings can be discovered.
- Permit adequate answers to complete questions.
- Permit creativity, self-expression, and richness of detail
- Reveal a respondent's logic, thinking process and frame of reference.
- Provide respondents with maximum flexibility in answering questions

Disadvantages of Open-ended questions

- Different respondents give different degrees of detail in answers - responses may not be consistent.
- Responses may be irrelevant or buried in useless detail.

- Comparison and statistical analysis become very difficult.
- Coding responses is difficult.
- Articulate and highly literate respondents have an advantage.
- Responses are written verbatim, which is difficult for interviewers.
- Greater amount of respondent time, thought and effort is necessary.

b. **Closed-ended (structured, fixed response) questions:** A closed ended questions ask questions and give the respondent fixed response from which to choose. Most answers are variables having two or more discrete categories. Category style depends at least up on whether the variable is (i) nominal, (ii) ordinal, (iii) interval or (iv) ratio.

e.g. Is the president doing (a) very good, (b) good, (c) fair, (d) poor job in your opinion?

Advantages of closed-ended questions

- Easier and quicker for respondents to answer.
- Easier to compare the answers of different respondents.
- Easier to code and statistically analyze.
- Response choices can clarify questions for respondents
- Less articulate or less literate respondents are not at a disadvantage

Disadvantages of closed-ended questions

- Can suggest ideas that the respondents would not otherwise have.
- Respondents with no opinion or no knowledge can answer anyway.
- Respondents can be confused because of too many choices.
- Misinterpretation of a questions can go unnoticed
- Force people to make choices they want of not make in the real world.

The closed-ended questions can further be seen from the following sub-categories:

i. **Dichotomous questions:** Dichotomous questions give two choices: either “Yes” or “No”, or a choice of two opposite alternatives. They are preferred for starting interviews, are easy to tabulate, and can be used as a lead-in for more specific questions to a particular group.

Weaknesses of dichotomous questions:

- They can force a choice where none exists or lead to bias. E.g. "Do you still cheat on your taxes?" Yes__ No__
- Only few questions can be framed in terms of a dichotomy; more complex questions cannot be done with this method.

ii. **Multi-chotomous questions:** Such questions provide several alternatives to respondents. In some cases, they may be asked to select only one from a list or asked to select as many as are applicable. The advantages of the multi-chotomous question are: ease of administration, ease of tabulation, and flexibility for factual as well as attitudinal responses. Some disadvantages exist in the length of the list of alternative responses;

response alternatives may not be mutually exclusive; or reading the list may lead the respondent to a particular response.

iii. **Scales:** Although a scale can be considered a multi-chotomous question, it deserves separate consideration. The benefits of a scale are that it permits the objective measurement of attitude and feelings. This allows for the identification of segments that are more favorably inclined toward a product, service, or issue. Scaling is somewhat subject to various frames of reference differences and to the effect. Some debate exists concerning whether scales would be balanced or unbalanced. Balanced scales have the same number of responses on the positive side of the scale as on the negative side of the scale. Unbalanced scales have more possible responses on one side of the scale than the other, usually the positive side. Some debate also exists over whether to have a neutral response. Those who feel there should be a “neutral “ option believe so because they think that this is a legitimate response category and for the sake of accuracy the respondent should have that “ground to stand on”. People against having a neutral response category argue that most individuals are unlikely to be authentically neutral on the issue. They consider the neutral as an easy way out or a “polite negative.” Consequently, they feel that it is much better to frame the issues that the respondent is “forced” to indicate a preference, however slight.

The “don’t know, or “no opinion” response should always be available to respondents. An honest expression of a lack of awareness, experience, or thought given to an issue should be allowed so that these responses are not lumped together with those people who have considered the issue and find their position is the neutral point on the scale.

Step 5. Develop the specific questions

This step deals with the actual writing of the specific questions that will be asked. The elements in the previous steps, to a large extent, control the content of the questions. Questions should be worded in ways that avoid leading, pressuring, or embarrassing the respondent. The questions should avoid ambiguous words.

Some basic rules and considerations for wording questions

i) **Keep the questions short, simple and in everyday language**, and to the point. Reasons for keeping the questions as brief as possible are that longer questions make the response task more difficult, are more subject to error on the part of both interviewers and respondents, cause a loss of focus, and are less likely to be clear. Moreover, your respondents may not be well-educated and even if they are, they may not be able to understand some jargon words. Ambiguous questions (i.e., a question that is interpreted differently by different respondents) should also be avoided.

Example:- Let us consider the following two questions:
a “Is any one in your family a dipsomaniac?”

b “Is your work made difficult because you are expecting a baby?” Yes No
From these, the first question suffers from lack of clarity because the word dipsomaniac is jargon. On the other hand, the second question suffers from its ambiguous nature because, for example, we do not know what type of work and the stage of pregnancy the question implies.

ii) **Do not ask double-barreled questions:** - This implies a question with a question. Therefore, one question should not ask more than one thing at a time because we do not know which particular question the respondent has answered.

Example, “How often and how much time do you spend on each visit?” This question has two

questions. Here, we can not identify for which a respondent gives his/her response.

iii) **Avoid identifying the sponsor of the survey:** In such cases as customer satisfaction surveys, the researcher may want to identify the sponsor of the survey. In most case, however, it is best to not identify the sponsor to collect more objective responses.

iv. **Keep the questions as neutral as possible** (avoid leading questions). A leading question is one which, by its structure, contents, or wording leads a respondent to answer in a certain direction (either positively or negatively).

Example, “Living cost is getting cheaper, is not it?”

“Equity on payment has a direct implication on employees turnover, is that not?”

One problem from these questions is that they are not questions rather they are statements that lead the respondents to say “Yes”. That means, these non-objective questions tend to be leading because they suggest an answer.

v. **Do not ask unnecessary questions.** Always ask yourself “Is this question necessary?”

Each question should relate or add meaning to a specific research objective. If the question falls in the “nice to know” but “not necessary” category, leave it out.

vi. **Avoid asking questions the respondent either cannot answer or will not answer**

Since respondents will answer most questions, it is important to determine if a respondent can be expected to know the information desired. On other occasions, respondents will have the information required may not be willing to divulge it. If a question appears to be sensitive, it may be best to leave it out. It is crucial to the research objective, and then it is best to ask the sensitive question later in the survey after a degree of trust has been established with the respondent.

vii. **Avoid asking overly personal questions:** Words or phrases that show bias are emotionally charged and will lead to inaccurate results. When sensitive questions must be asked, they should be asked after a warm-up period and/or hidden within a series of less personal questions.

viii. **Do not ask questions that are based on presumptions.** – In such questions, the researcher assumes that respondents fit in to a particular category and seeks information based up on the assumption.

Example, if these questions are asked, “How many bottles of beer do you drink per day?”
Or “What type of contraceptives do you use?”, they were asked without knowing whether the respondents drink beer or sexually active.

ix. **Keep it readable.**

x. **Make all definitions, assumptions, and qualifiers clearly understood:** For example, the terms like “adequate”, “minority”, “value”, “how much”, “usually”, “convenient”, “most”, “quality”, “procedures”, “diversity”, “not too often”, “acceptable”, “very often”, “now”, “you”, “never”, and “salary” are full of ambiguities. If you ask about salary, you have to specify whether it is gross or net and its rate (per day, per month, per year, etc). For numerical responses, specify the unit of measurement. Make also sure that the respondent has all the information necessary to answer the question.

xi. **Avoid making significant memory demands:** For example, the question “How many times did you visit the library last year?” requires the respondent to sit for long and recall. Rather, if the question is asked like this, “About how much time did you spend to visit library in the last year?” the respondent can accurately answer it because its memory and cognitive demand are not so much demanding.

xii. **Avoid asking for very precise responses:** Such specific answer demanding question as “What is your exact yearly income in Birr?” also become cognitive demanding.

xiii. **Avoid asking for broad generalizations about attitudes or opinions:** For example, in stead of asking “Do you consider your self hard working business person?”, ask, “How many hours did you study yesterday?”, “How many hours per day do you usually study?”, and other questions to infer the opinion rather than simply ask opinion. In order not to make your questionnaire lengthy, try not to ask very specific questions as well.

xiv. **Make the item easy and fast to be answered**

viii. **Keep it interesting:** Do not make your items monotonous.

Response-category format

i) **Blank space:** These are used especially for answers to open-ended questions. The researcher should be able to carefully estimate the amounts the respondents write and sufficient space.

ii) **For closed-ended questions, response categories** are written in different styles based on the type of variable. Responses can be checked on blank spaces, in box, or they may be encircled.

Example:

Check the appropriate blank

1-Sex: Male____ Female____

2- What type of soft drink do you drink? Coca-cola____ Sprite____ Fanta _____
Pepsi____

Check the appropriate box

1. Sex: Male Female

Circle the appropriate number

1. Sex: Male 1 Female 2

iii) **Inventory method:** An inventory is list of items to be checked or marked by the respondent.

Example: check all the ways in which you have learned about product X in the last week.

___Internet

___Television

___News papers

___Magazine

___Word of mouth

___Other means (please specify)

iv. **Grid format:** These are boxed formats frequently used to evaluate each item in an inventory. It can also be a two way inventory.

Illustration: Look how a grid is designed to seek response from respondents on both the type of News and Media used.

	TV	Internet	Radio	News Paper	Magazine	Friends or colleagues
BBC news						
CNN news						
ERT news						

iv. **Ordinal/ Likert Scale:** - By this technique, you construct the same answer format for a whole series of questions. In other words, one set of category labels can serve for a whole set of categories if the labels are placed above the categories like titles.

Illustration: Suppose Arba Minch Tourist Hotel has made feedback surveys from its clients. It presents response-format in the following grid.

v) **Semantic differential responses:** In this method, a list of responses as a continuum with labels only at the extremes can be used.

Illustration: To what extent do you feel Students should have a voice in determining course content and degree requirements?

Students should make										Curriculum matters
the final decisions about										
Curriculum matters										left to instructors

0 1 2 3 4 5 6 7 8 9

vi. **Ranked Responses:** Sometimes it is useful for the respondent to rank a set of options by numbering them in order from 1 to the maximum number you are interested in.

For example,: “Place in order of importance to you the following reasons of employee turnover in Arba Minch University” (Indicate by numbering from 1-4 in order where 1 is the most important factor)

- The hot Climate
- Poor Fringe Benefits
- Shortage of Basic facilities
- Administrative problems
- Employees relations problems

Note that each option will need to be coded as a separate variable and in the above case five variables are required (even though only four ranks are to be identified). This approach can generate a lot of data and so the number of options used should not be excessive. Apart from this, respondents find it difficult to discriminate meaningfully between lots of options.

vi. **Interval Scales:** In this case, the questions have the responses in interval (range) format. Example:

- | | | | | |
|-------------------------------------|-----------|---------|---------|------------|
| 1. What is your age (in years)? | 10-20 | 21-30 | 31-40 | Above 40 |
| 2. What is your daily income in Br? | Below 250 | 251-500 | 501 100 | Above 1000 |

Comprehensive example for the preceding steps: - Let us consider the study to evaluate community responsiveness in a health program. Consider the following table:

Objective/question/hypothesis	Main	and	associated	research	questions
Information required	Questions				

1.To find out the understanding of the concept “ community responsiveness” among health administrators, managers, service providers and consumer of health services What is community responsiveness? What does it mean when people use the term “community responsiveness?”

What are the differences in the perception of community responsiveness among health administrators, planners, managers, service providers and consumers of health services?

1.Perceptionof community responsiveness

2.Occupational status, i.e. health administrator, planner, service provider or consumer

3. Age, gender, education Q1.1.When you use the term “community responsiveness”, what do you mean by it?

Q 1.2. What comes to your mind when you use the term “community responsiveness” in the delivery of health services?

Q1.3. What, in your opinion, are the characteristics of “community responsiveness”?

Q1.4. What, in your opinion, is the difference between “community development and community responsiveness”?

Q2.1. Would you categorize your job as?

Health administrator/planner

Service provider

Health consumer

Q 3.1. How old are you? _____

Q3.2. Are you ____Female _____Male?

Q3.3. What is the highest level of educational achievement you have attained?

2. To identify the strategies needed to foster community responsiveness in the delivery of health services

3. To develop a set of indicators to evaluate the effectiveness of strategies to foster community responsiveness

Table 6.1. Sample of questionnaire developed based on certain research questions or objectives

Step 6. **Determine question sequence and length of the questionnaire**

This step six can be extremely important in the completion rate of the survey. Excessive length may deter some respondents from completing the survey. This step can be equally important to the quality of the results acquired. The sequence of the questions should follow a logical pattern so it follows smoothly and effortlessly from one section to another. Another important consideration is to ensure that questions building on previous questions are placed properly in the questionnaire. Generally, questions will flow from the general to the specific. This warms up the respondents and lets them reflect appropriately before being asked specific questions that require good recall and some degree of detail. Skip patterns of branching questions need to be carefully designed. Quite often, a respondent must be directed to a specific location in the questionnaire based on a previous question. For example, “Have you baked brownies in the past three months?” “Yes” respondents go on to answer specific questions about the baking occasion while “No” respondents skip to a different part of the survey. Personal, telephone, and Internet surveys lend themselves more to branching than do mail questionnaires.

Most questionnaires have three basic sections

(a) Introduction

(b) Body/content, and

(c) Classification section.

(a) Introduction: The introduction tells the respondent who the researcher is, why he is requesting the respondent’s information, and explains what is expected of the respondent. The introductions should explain the purpose of the questionnaire and enlist the co-operation of the respondent. In case of a mail survey, this may take place in an attached cover letter. On the phone, this is accomplished with a positive tone without sounding like a polished sales pitch. Most people want to express their opinion as long as they know it is not a sales device. The introduction should promise to keep the respondents identity anonymous and his/her information will be kept confidential. Often the introduction will

qualify the respondent in special way to make sure that the interviewer is talking only to the right respondents. Qualification questions may include brand usage, age/sex categories, security issues such as whether the respondent or any member of his/her households for a competitor of the client, an advertising agency or a marketing research company. (For more information on this theme, please see discussions given under the section Organizing Questionnaire).

(b) **Body/Content:** The body or main content of the questionnaire provides basic information required by the research objectives. This is usually the most substantial portion of the questionnaire. If the respondent has not been qualified in the introduction, the first question of this section should identify the proper respondents and have instructions to end the survey for all others. This section should begin with easy, direct question. Place questions that are personal or reflect a sensitive issue well toward the end of the body. Once respondents have become interested in the survey, they are more likely to respond to personal or sensitive issues.

(c) **Classification section:** The final section is designed to obtain cross-classification information such as sex, income, educational level, occupation, marital status, and age. The demographic data allows for comparisons among different types of respondents. Certain market segments may emerge through the use of this cross-classification data.

Step 7. Predetermine coding

Questionnaires should be pre-coded so that any difficulties encountered in entering data in to computer tabulation and analysis programs may be solved before the data are gathered. Once the questionnaires are completed and returned, the responses can be quickly entered in to the database and results generated.

Step 8. Pretest the questionnaire

This is an essential step that should not be ignored. Following the maxim, "The proof is in the pudding," a questionnaire should be pre-tested before it is administered. A questionnaire may be too long, ambiguous, incomplete, unclear, or biased in some way. A thorough pretest help overcome these problems and it will help refine any procedural problems a questionnaire might have. Some of the procedural problems might be improper skip patterns and misunderstanding the interviewer. A pretest will evaluate and fine-tune the questionnaire, estimate the time required for completion of the interview, and allow for setup of coding refinements for tabulations. The pretest should be administered under actual field conditions to get an accurate response. If significant changes result from an original pretest, it is advisable to conduct a second pretest after making appropriate revisions. A relatively small number of interviews are sufficient to pretest a normal questionnaire. Once they have been completed, all interviewers who participated should report their findings. They will be able to determine whether the questions work and be able to make suggestions for revisions.

Step 9. Review and revise the questionnaire

Based on the pretest and a thorough review of all the previous steps, the questionnaire should be revised. The bottom line for an effective data-gathering instrument is the accuracy of the data collected. Everything that can possibly be done in advance should be done to ensure the accuracy of the instrument.

The steps used to design an effective data-gathering instrument need to be viewed as a dynamic outline and not a sequential step-by step process. Each step should be applied with a sharp eye on the research objectives and the data needs they require. The finished questionnaire is the result of re-articulating the study objectives in to a set of effective questions for extracting the required information from the pertinent set of respondents.

General rules of Question order in a questionnaire

i. **Put sensitive questions, open-ended questions late in the questionnaire.** Since open-end require more thought and writing, we should not place them first. Additionally, if sensitive questions (e.g. such as sexual behavior, income, religion, and etc) are placed first, respondents may react to them negatively or they refuse to answer.

ii. **Ask easy-to answer questions first:** - The opening questions should require little thought. Moreover, they should be interesting to stimulate respondents to complete the questionnaire.

Usually, opening questions are about background information such as age, gender, educational status, marital status, etc.

iii. **Place questions and answer Choice in logical order:** Answer choice order can also make individual questions easier or more difficult to answer. Whenever there is a logical or natural order to answer choices, use it. Always present agree-disagree choices in that order. Presenting them in disagree-agree order will seem odd. For the same reason, positive to negative and excellent to poor scales should be presented in those orders. When using numeric rating scales higher numbers should mean a more positive or more agreeing answer.

The questions have to be arranged in some general order, such as time sequence and sub-topics of the study. For example, if fertility survey of a given family is designed, it should include job history, contraceptive practices, birth rates, and etc. Therefore, time and care must be taken against mixing topics or frames of reference as well as against jumping abruptly from one frame of reference to another.

Grouping together questions on the same topic makes the questionnaire easier to answer. Question order can affect the results in two ways. One is that mentioning something (an idea, an issue, a brand) in one question can make people think of it while they answer a later question, when they might not have thought of it if it had not been previously mentioned. In some cases you may be able to reduce this problem by randomizing the order of related questions. Separating related questions with unrelated ones can also reduce this problem, though neither technique will eliminate it.

The other way question order can affect results is habituation. This problem applies to a series of questions that all have the same answer choices. It means that some people will

usually start giving the same answer, without really considering it, after being asked a series of similar questions.

If you are using telephone, computer direct or Internet interviewing, good software can help with this problem. Software should allow you to present a series of questions in a random order in each interview. This technique will not eliminate habituation, but will ensure that it applies equally to all questions in a series, not just to particular questions near the end of a series.

Another way to reduce this problem is to ask only a short series of similar questions at a particular point in the questionnaire. Then ask one or more different kinds of questions, and then another short series if needed.

A third way to reduce habituation is to change the “positive” answer. This applies mainly to level-of-agreement questions. You can word some statements so that a high level of agreement means satisfaction (e.g., “My supervisor gives me positive feedback”) and others so that a high level of agreement means dissatisfaction (e.g., “My supervisor usually ignores my suggestions”). This technique forces the respondent to think more about each question. One negative aspect of this technique is that you may have to modify some of the data after the results are entered, because having the higher levels of agreement always mean a positive (or negative) answer makes the analysis much easier. However, the few minutes extra work may be a worthwhile price to pay to get more accurate data.

The order in which the answer choices are presented can also affect the answers given. People tend to pick the choices nearest the start of a list when they read the list themselves on paper or a computer screen. People tend to pick the most recent answer when they hear a list of choices read to them.

iv. Avoid establishing a response set: A response set is a tendency to reply to items in particular way, regardless of the questions content or the correct answer. The response set is may be created due to social desirability of statements, tendency of the respondents to answer yes rather than no, a problem of question sequence (e.g. sequence of questions asked in a similar format can lead to stereotyped responses), and etc.

v. Separate reliability-check question pairs: Pairs of questions, one stated positively and the other negatively, are often used to check reliability.

Example, “Abortion should be legalized (agree/disagree)” at one point in the questionnaire and “abortion should not be legalized (agree/disagree)” at other point.

vi. Vary questions by length and type: This may help keep the respondent interested.

vii. Determine whether funnel technique is applicable: In this technique, broad, general or easy to answer open-ended/ closed-ended questions are asked first, and then asking more specific questions narrows the funnel. This method puts the respondents at ease. By using the technique, in conjunction with “filter” questions, the researcher can determine whether specific questions apply to the respondent, and thus avoid asking questions that do not. A filter or screening determines whether future questions are applicable to the respondent. For example, instead of asking the respondent how many bottles of beer he/she smokes or what brand, the researcher first asks whether the respondent drinks beer. If the answer is no, the specific drinking questions are skipped.

IV. Focus Group Discussion /FGD/

A Focus Group Discussion (FGD) is a group discussion of approximately 6 - 12 persons guided by a facilitator, during which group members talk freely and spontaneously about a certain topic. An FGD is a qualitative method. Its purpose is to obtain in-depth information on concepts, perceptions and ideas of a group. An FGD aims to be more than a question-answer interaction. The idea is that group members discuss the topic among themselves, with guidance from the facilitator. FGD techniques can be used to:

1. Focus research and develop relevant research hypotheses by exploring in greater depth the problem to be investigated and its possible causes.

Example: a district health officer had noticed that there were an unusually large number of cases of malnutrition of children under 5 reported from one area in her district. Because she had little idea of why there might be more malnutrition in that area she decided to organize three focus group discussions (one with leaders, one with mothers from the area and one with health staff from the area). She hoped to identify potential causes of the problem through the FGDs and then develop a more intensive study, if necessary.

2. Formulate appropriate questions for more structured, larger scale surveys.

Example: In planning a study of the incidence of childhood diarrhea and feeding practices, a focus group discussion showed that in the community under study, children below the age of 1 year were not perceived as having 'bouts of diarrhea' but merely 'having loose stools' that were associated with milestones such as sitting up, crawling, and teething. In the questionnaire that was developed after the FGD, the concept 'diarrhea' was therefore carefully described using the community's notions and terms.

3. Help understand and solve unexpected problems in interventions.

Example: In District X, the recent national (polio) immunization days (NID) showed widely different coverage's per village (50-90%) and in a number of villages a marked decrease in coverage was observed compared to last year. Eight FGD were held with mothers, two in town, three in rural villages with a marked decrease in NID coverage and three in villages with a high coverage throughout. It appeared that overall, the concept NID had raised confusion. Most people believed that this mass campaign strengthened the children's immunity against any (childhood) disease, including malaria and Respiratory Tract Infections. In the villages with a low NID coverage there had been a high incidence of malaria in children immediately after the previous NID campaign and several children died. Mothers therefore believed that the NID campaign was useless.

4. Explore controversial topics.

Example: Sexual behavior is a controversial topic in the sense that males and females judge sexual relations and sexuality often from very different perspectives. Sexual education has to take this difference into account. Through FGDs, first with females, then with males, and then with a mixed group to confront both sexes with the different outcomes of the separate discussions (listed on flip charts) it becomes easier to bring these differences in the open. Especially for teenagers, who may have many stereotypes about the other sex or

be reluctant to discuss the topic openly (particularly girls), such a 'multi-stage' approach is useful.

Strengths and limitations of FGD

Implementation of FGDs is an iterative process; each focus group discussion builds on the previous one, with a slightly elaborated or better-focused set of themes for discussion. Provided that the groups have been well chosen in terms of composition and number (see below), FGDs can be a powerful research tool which provides valuable spontaneous information in a short period of time and at relatively low cost.

FGD should not be used for quantitative purposes, such as the testing of hypotheses or the generalization of findings for larger areas, which would require more elaborate surveys. However, FGDs can profitably complement such surveys or other, qualitative techniques. Depending on the topic, it may be risky to use FGDs as a single tool. In group discussions, people tend to centre their opinions on the most common ones, on 'social norms'. In reality, opinions and behavior may be more diverse. Therefore, it is advisable to combine FGDs with at least some key informant and in-depth interviews. Explicitly soliciting other views during FGDs should be routine as well.

In case of very sensitive topics, such as sexual behavior or coping with HIV/AIDS, FGDs may also have their limitations, as group members may hesitate to air their feelings and experiences freely. One possible remedy is the selection of participants who do not know each other (e.g., selection of children from different schools in FGDs about adolescent sexual behavior), while assuring absolute confidentiality.

It may also help to alternate the FGD with other methods, for example, to precede it by a self-developed role play on sexual behavior, or to administer a written questionnaire immediately after the FGD with open questions on sexual behavior in which the participants can anonymously state all their questions and problems.

Another way to ensure confidentiality in a FGD on a sensitive topic is giving participants an option to introduce themselves under any name they would like to use (not necessarily their own). Further, before the discussion, it should be stressed that they may bring up experiences of friends and brothers/sisters as well as their own, and that it is not necessary to bring painful personal experiences in the open.

6.2. Secondary source of data

Secondary data means data that are already available i.e., they refer to the data which have already been collected and analyzed by someone else. Secondary data are collected by others and used by others. Any data that has been collected earlier for some other purpose are secondary data in the hands of an individual who is using them.

Advantages of secondary data

1. It is found more quickly and cheaply
2. Helps much on past events and distant places, where the researcher cannot afford to collect the data right now.

Disadvantages of Secondary data

1. The information does not meet one's specific needs, since it is collected by others for their own purpose, definitions would differ, units of measurements would differ, and different time periods may be involved.
2. It is difficult to assess the accuracy of the information because one knows little about the research design or the conditions under which the research took place.
3. It is often out of date: a study made five years ago may not be relevant today.
4. This type of data may not be free from personal bias and prejudices.
5. It may not be adequate.

Classifications of Secondary Data Sources

- 1) **Internal sources:** Internal data come from internal sources related with the functioning of an organization or a firm where records regarding purchase, production, sales, profits, etc are kept on a regular basis. However, the internal data can be either insufficient or inappropriate for the statistical enquiry into a phenomenon. In that situation, we need external data. Organizational sources include department reports, producer summaries, financial and accounting reports, marketing and sales studies.
- 2) **External sources of information:** The external data are collected and published by external agencies. It includes the sources outside the organization. E.g. books, periodicals, government documents, reference books, encyclopedia, journals, magazines, government and non-government reports.

Chapter Summary

Dear learner! In this chapter, you learnt about data collection. Data refer to facts, figures and other relevant materials serving as bases for a study and analysis. You saw two types of data: Primary Data and Secondary Data. Primary sources are original sources for first-hand or primary data. Second-hand or secondary data in turn are sourced from secondary sources which contain data which have been collected by some other agency for other purpose.

For the collection of primary or secondary data, a number of Methods apply. For primary data collection, some of the basic methods used include observation, interviews, questionnaire, Schedules, and Focus Group Discussions. Mainly, there are two sources of secondary data: Internal sources and External sources. Whereas internal secondary data are obtained from sources related with the functioning of an organization or firm, the external data are collected and published by external agencies or outsider organization.

Chapter review questions

Choose the BEST answer from the alternatives

1. Identify the most important issue in data collection
 - A. Determining from where to find data
 - B. Specifying time period to collect data
 - C. Tracking data collecting staff in the field
 - D. All
 - E) none
2. A data mostly subject to numerical analysis is
 - A. Primary data
 - B. Qualitative data
 - C. Secondary data
 - D. Quantitative data
3. Which one of the following cannot be the advantage of secondary source of data as compared to the primary one?
 - A. Economical
 - B. Saves Time.
 - C. Improves an understanding of the problem
 - D. Secondary data may be somewhat out of date.
 - E. None
4. Primary data is
 - A. data that are already available
 - B. Data which have already been collected and analyzed by someone else.
 - C. Data collected by others and used by others.
 - D. Any data that has been collected earlier for some other purpose.
 - E. original observations collected by the researcher or his agents for the first time.
5. The two most common means of collecting data are
 - A. Interview and questionnaire.
 - B. Schedule and questionnaire
 - C. Observation and questionnaire
 - D. Interview and observation
6. The slowest but less biased primary data collection method is;
 - A. Questionnaire
 - C. Observation
 - B. Interview
 - D. Schedule
7. An interview in which the interviewer asks the questions face-to-face with the interviewee is called_____
 - A. Personal Interviews
 - B. Telephone Interviews
 - C. Computer Direct Interviews
 - D. E-mail Surveys

8. Mailed questionnaire is characterized by one of the following
- A. Mail surveys allow the respondent to answer at their leisure.
 - B. Mailed questionnaires are both very economical and very fast.
 - C. The respondents must have access to a computer
 - D. Response rates are usually higher in Mailed surveys

CHAPTER SEVEN

DATA ANALYSIS

Introduction

Dear learner! In the preceding chapter, you learned about data and methods of data collection. But in this chapter, you will see the next step in a research process, i.e. how to process and make sense of the data collected in the form of written text. As discussed in previous chapter, this text may be derived from observations, interviews, case studies or other sources. Now we will discuss how to categorize, synthesize and analyze this data. Analysis of data involves summarizing the collected data and organizing these in such a manner that they will yield answers to the research questions .

Analysis of data means to make the raw data meaningful or to draw some results from the data after the proper treatment.

Chapter outlines

7.1. Data Processing

7.2. Data Analysis

7.2.1. Descriptive Analysis

7.2.2. Inferential Analysis

7.3. Data analysis software

7.1. Data Processing

Technically speaking processing implies recording, editing, coding, classification and tabulation of collected data. Data collected during the research is processed with a view to reducing them to manageable dimensions. A careful and systematic processing will highlight the important characteristics of the data, facilitates comparisons and render it suitable for further statistical analysis and interpretations. In other words, data processing is an intermediate stage between the collection of data and their analysis and interpretation.

Once data are processed, the data presentation exercise begins. A detail discussion of some broad areas of work for statistical processing and analysis is given below.

1. **Logging/Recording the Data :** For the incoming data from different sources you need to set up a procedure for logging the information and keeping track of it. To do so, in most cases, researchers set up a database that enables to assess at any time what data is already in and what is still outstanding. This can be done with any standard computerized database program (e.g., Microsoft Access, Claris File maker). Or you can accomplish these using standard statistical programs (e.g., SPSS, SAS, Minitab, Data desk).
2. **Checking the Data for Accuracy/ Editing:** Editing of data is a process of examining the raw collected data to detect errors and omissions and to correct these when possible. Editing is done to assure that the data are accurate, consistent with other facts gathered, uniformly entered, as complete as possible and have been well arranged to facilitate coding and tabulation.
There are several questions you should ask as part of this initial data screening:
 - Are the responses legible/ readable?
 - Are all important questions answered?
 - Are the responses complete?
 - Is all relevant contextual information included (e.g., data, time, place, researcher)?
3. **Coding:** Refers to the process of assigning numbers or other symbols to answers so that responses can be put into a limited number of categories or classes. Coding is necessary for efficient analysis and through it the several replies may be reduced to small number of classes which contain critical information requires for analysis.
4. **Classification:** Is the process of arranging data into sequences and groups according to their common characteristics, or separating them into different but related parts. It Is the scheme of breaking a category into a set of parts, called classes, according to some precisely defined differing characteristics possessed by all the elements of the category. It Is the arrangement of data into different classes which are to be determined depending upon the nature, objective, and scope of the enquiry. Classification Is the process of arranging data in groups or classes on the basis of common characteristics.
5. **Tabulation:** Is the process of summarizing raw data and displaying the same in compact form (i.e., in the form of statistical tables) for further analysis. It Is an orderly arrangement of data in columns and rows.
6. **Graphic presentation of data:** Another way of presenting data is in form of diagrams and graphs. There are two major categories of graphs: The natural scale graph and Ratio scale graph.
 - a. The natural scale graph: is more frequently used.
Further there are two sub-types of the natural graphs:

- Time series graph: shows the data against time, which could be any measure such as hours, day, weeks, months and years.
 - i. **Line Graph:** Time period is measured along X-axis and the corresponding values are on the Y-axis.
 - ii. **Silhouette or Net Balance Graph:** In such a graph the two related series are plotted in such a manner as to highlight the difference or gap between them.
 - iii. **Component or Band Graph:** Under this device, phenomena, which form part of the whole, are shown by successive bands or components to enable an overall picture along with the successive contributions of the component.
 - iv. **Range Graph:** This graph shows the range, that is the highest and the lowest of a certain product or items under reference.
- Frequency graph: In frequency graphs, time is not a measure instead some other variables such as income of employees, the number of employees earning that income, is plotted on a graph.

Within frequency graph category, there are some specific graphs such
as Histogram,
Frequency polygon,
and The ogive curve.

7.2. Data Analysis

Analysis of data involves summarizing the collected data and organizing these in such a manner that they will yield answers to the research questions. Analysis of data means to make the raw data meaningful or to draw some results from the data after the proper treatment.

Analysis means the computation of certain indices or measures along with searching for patterns of relationship that exist among the data groups. Analysis may be classified as descriptive analysis and inferential analysis

7.2.1. Descriptive Analysis

In descriptive statistics we are simply describing what is or what the data shows. They provide simple summaries about the sample and the measures. With descriptive statistics you are simply describing what is, what the data shows.

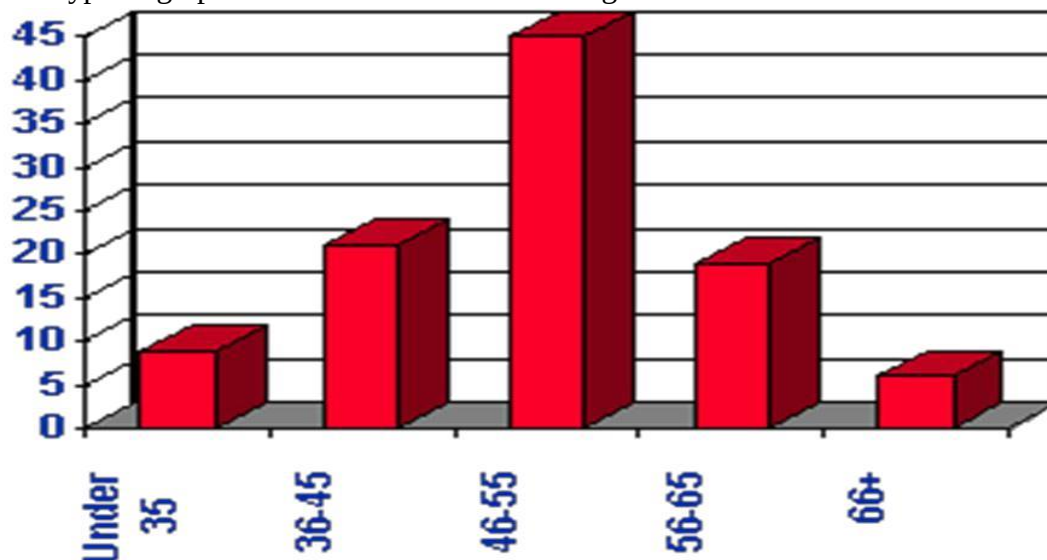
a. Univariate Analysis

Univariate analysis involves the examination across cases of one variable at a time. There are three major characteristics of a single variable that we tend to look at:

- The distribution : The distribution is a summary of the frequency of individual values or ranges of values for a variable. The simplest distribution would list every value of a variable and the number of persons who had each value. One of the most common ways to describe a single variable is with a frequency distribution.

Frequency distributions can be depicted in two ways, as a table or as a graph.

Fig.1 shows an age frequency distribution with five categories of age ranges defined. This type of graph is often referred to as a histogram or bar chart.



Distributions may also be displayed using **percentages**.

- **The central tendency:** The central tendency of a distribution is an estimate of the "center" of a distribution of values. It tells us the point about which items have a tendency to cluster. There are three major types of estimates of central tendency: The Mean or average or arithmetic **mean** is probably the most commonly used method of describing central tendency. To compute the mean, add up all the values and divide by the number of values. The **Median** is the score found at the exact middle of the set of values. One way to compute the **median** is to list all scores in numerical order, and then locate the score in the center of the sample. The mode is the most frequently occurring value in the set of scores. To determine the mode, you might again order the scores and then count each one. The most frequently occurring value is the mode.
- The **dispersion:** refers to the spread of the values around the central tendency. The common measures of dispersion include the range, the variance and the standard deviation.

b. Bivariate and Multivariate Analysis

Whenever we deal with data on two or more variables, we said to have a bivariate or multivariate population. Such situations usually happen when we wish to know the relation of the two and/or more variables in the data with one another. There are different methods of determining the relationship between variables.

We have to answer two types of questions in bivariate or multivariate analysis: Does there exist association or correlation between the two (or more) variables? If yes, of what degree? Is there any cause and effect relationship between two variables in case of bivariate population or between one variable on one side and two or more variables on the other side in case of multivariate population? If yes, of what degree and in which direction? The

first question can be answered by the use of correlation technique and the second question by the technique of regression.

In case of bivariate population:

-Correlation can be studied through:

- i. Cross tabulation
- ii. Scattergram
- iii. Charles Spearman's Coefficient of correlation
- iv. Karl Pearson's Coefficient of correlation.

-Cause and effect relationship can be studied through; Simple regression analysis

In case of multivariate population

Correlation can be studied through;

- Coefficient of multiple correlation,
- Coefficient of partial correlation

-Cause and effect relationship can be studied through: Multiple regression

7.2.2. Inferential Analysis

We use inferential statistics to try to infer from the sample data what the population thinks. We use inferential statistics to make inferences from our data to more general conditions; we use descriptive statistics simply to describe what's going on in our data.

7.3. Data analysis software

Guidelines to Process Data's Using SPSS

Checking the Reliability of Measures: Cronbach's Alpha:

- The closer the reliability coefficient gets to 1.0, the better.
- In general, reliabilities less than .60 are considered to be poor, those in the .70, range, acceptable, and those over .80 good.
- It is important to note that all negatively worded items in the questionnaires should first be reversed before the items are submitted for reliability test.
- Unless all the items measuring a variable are in the same direction, the reliabilities obtained will be incorrect.

Reliability Analysis

1. From the menu, choose

Analyse

Scale

Reliability analysis

2. Select the variables constituting the scale

3. Choose model alpha.

Obtaining Descriptive Statistics: Frequency Distributions

- Frequency distribution was obtained for all the personal data or classification variables.

Frequencies

From the menus,

choose Analyze

Descriptive statistics

Frequencies

(Select the relevant

variable) Choose needed:

Statistics

Charts....

Format (for the order in which the results are to be displayed)

The frequencies can also be visually displayed as bar charts, histograms, or pie charts by clicking on statistics in the menu then summarize, then Frequencies, and charts in the frequencies dialog box and then selecting the needed chart.

Pearson Correlation

Matrix From the menus,

choose: Analyze

Correlate

Bivariate

Option.....

Select:

- Type of correlation coefficient: select relevant one. For example Pearson, Kendall's, Tau, Spearman.
- Test of significance –two tailed, one –tailed.

T-Test for Difference between Two Groups

(Independent Sample Test)

Choose

Analyse

Compare means

Independent- samples t- test

Select a single grouping variable and click Define groups to specify the two codes to be compared.

Options.....

(Specify confidence level required - .05, .01, etc.)

Analysis over Variance (ANOVA)

Choose

Analyze

Compare means

One-way ANOVA

(Select the dependent variable's and one independent factor variable)

For post hoc test to determine in which of the multiple groups the differences lie click on:

Post hoc

(Select from among the many tests such as Bobferoni, scheffe, Tukey, Duncan, as appropriate)

Chi-Square Test

Choose:

Analyze

Descriptive Statistics

Crosstabs.....

(Enter variables in the rows and columns boxes)

Statistics

Select Chi-Square

Multiple Regression Analysis

Choose

Analyze

Regression

Linear

(Enter dependent and independent variables)

Chapter Summary

In this chapter, you learned about data processing and analysis. Data processing involves the edition, coding, classification and tabulation of collected data. The data collected are edited for their consistency, completeness, accuracy, uniformity, and computations. In data coding, a researcher assigns number, digits or letters or both to various responses for easy tabulation. When the data are arranged into groups or classes according to their resemblances and similarities, it is termed as classification. Finally, tabulation involves the orderly and systematic presentation of numerical data in a tabular form.

Once data are processed, data presentation begins in which data analysis is made. Data analysis involves the computation of certain measures along with searching for patterns of relationships that exists among data group. To help the process of data analysis, software's can be used.

Chapter review questions

Choose the BEST answer from the alternatives

1. refers to the process of assigning figures or other symbols to answers so that responses can be put into a limited number of categories or classes?
 - A. Editing.
 - B. Coding.
 - C. Tabulation.
 - D. Classification.
2. The process of working-out statistical distribution, constructing of diagrams and calculating simple measures like averages, measures of dispersion, percentages, correlation, etc is called-----.
 - A. Data processing
 - B. Data analysis
 - C. Inference
 - D. All
3. Which of the following shows data processing?
 - A. Tabulation of frequency distribution
 - B. Examining errors and omissions in the questionnaire
 - C. Assigning numerical value for variables
 - D. All
 - E. None
4. Analysis of data is not characterized by one of the following
 - A. Analysis of data is one of the most important aspects of research
 - B. The data to be analyzed and interpreted should be reproducible
 - C. Task of analysis is complete without interpretation
 - D. None
5. What does data processing include?
 - A. editing
 - B. coding
 - C. classification
 - D. tabulation of collected data.

CHAPTER EIGHT

INTERPRETATION & REPORTING THE RESEARCH RESULT

Introduction

Dear learner! As you remember in the 6th and 7th chapters, you learned about data collection, and data processing and analysis. After data collection and analysis, a researcher has to accomplish the task of drawing inferences followed by report writing. Interpretation has to be done carefully so that misleading conclusion will not be drawn and the whole purpose of doing research will not be vitiated. Through interpretation, the researcher can expose relations and processes that underline his/her findings. If hypotheses are tested and confirmed, the researcher may arrive at generalizations. But in case the researcher had no hypothesis, he/she would try to explain his/her findings on the basis of some theory. All the analytical information and consequential inferences may well be communicated, preferably through research report, to the users of research results who may be individuals or groups or some public or private organizations. Accordingly, in the 8th chapter, issues including meaning of and rationale for interpretation, techniques of interpretation, precautions in interpretation, significance of report writing, steps in writing report, layout of research report, types of report, mechanics of writing report, and precautions for writing research report will be discussed in detail.

Chapter outline

8.1. Meaning & Techniques of Interpretation

8.2. Organization & Types of Reports

8.1. Meaning & Techniques of Interpretation

Interpretation refers to the task of drawing inferences from the collected facts after an analytical and/or experimental study. Interpretation is concerned with relationships within the collected data, partially overlapping analysis. It also extends beyond the data of the study to include the results of other research, theory and hypothesis.

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.

The significance of interpretation may also be examined in the case of statistical forecasting. Here it becomes a more crucial problem because if the forecast value is wrongly interpreted, it can lead to highly damaging situations at a future date. The image that emerges from the forecast becomes the guiding force in taking the decision regarding a particular activity of whatsoever nature it may be. Business forecasting plays a dominant role in the modern business decisions. Incorrect forecasts may cause heavy losses in business. To avoid such a situation, interpretation has to be most objective and unbiased, otherwise modern business will run in to difficulties. In general interpretation as two major aspects

- The efforts to establish continuity in research through linking the results of a given study with those of another
- The establishment of some explanatory concepts.

Techniques of interpretation

The task of interpretation is not an easy task. Rather it requires a good skill on the part of researcher. Interpretation is an art that one learns through practice and experience. The researcher may seek guidance from experts for accomplishing the task of interpretation. There are no existing rules to guide the researcher about how to interpret the data. However, the techniques of interpretation involve the following steps.

1. A researcher must give reasonable explanation of the relation which he/she has found and he/she must interpret the lines of relationship in terms of the underlying processes and must try to find out the thread of uniformity that lies under the surface layer of his/her diversified research findings.
2. Extraneous information or data, if collected during the study, must be considered while interpreting the final result of research study, for it may prove to be a key factor in understanding the problem under consideration.
3. It is advisable, before embarking upon final interpretation, to consult some one having insight into the study and who is frank and honest and will not hesitate to point out omissions and errors in logical argumentations. Such a consultation will result in correct interpretation and, thus, enhance the utility of research result.
4. A researcher must accomplish the task of interpretation only after considering all relevant factors affecting the problem to avoid false generalization. He/she must not be in hurry while interpreting results, for quite often the conclusion, which appear to be alright at the begging, may not at all be accurate.

8.2. Organization & Types of Reports

Report writing is a basic task of a researcher since no research can be completed without its report. In fact, a research without a report can be considered as a house without a roof. Any amount of observation or data analysis would be in vain from the manager's point of view if its report is not made available in aid of his/her decision-making process.

A research study culminates in the writing of a report, which is a tool for communicating the various aspects of the study, viz, the problem or topic investigated, the method employed to investigate, the objective, scope and limitations. However, prior to writing the report, its proper planning is essential. Report planning should take into account such details as defining the problem, the purpose of the report, tracking of the material collected, identifying the utility of the report, etc. The ability to write effective reports is one of the most useful skills a researcher can acquire. In this connection, we can say that a report is a communication from someone to another who wants to use that information.

The usefulness of a report is the chief aspect of any report writing. For example, a study dealing with the market segmentation of a company should be in a position to report on the exact distinction between customer groups and needs for the purpose of sub-dividing its market into specific subsets.

The report identifies areas for further research, if any, and for fresh hypotheses. Analysis and inferences, suggestions and observations, footnotes and appendices, etc should also find a place in the report. It should include specific recommendations for a course of action. While all the necessary information materials should be presented in the most appropriate manner, it should be purposeful and should take into account the reader and his/her tastes and preferences when it is written. In the normal course, the report writer should consider such questions as: who will read report? In what way is the report going to be useful? What are the questions the report should answer? How much information is needed? What is the best way of presenting the information? and so on. An effective report stimulates the interpersonal relationships in the organization. In this connection, we can observe that the reader is a human being, not a corporation. Report should provide answers, not create more problems.

8.4.2. Types of reports

For the purpose of convenience, reports may be classified on the basis of approach under the following titles:-

1. Business report and memorandum
 2. Project report
 3. Dissertation
 4. Commission's enquiry report and
 5. Thesis
-
1. Inductive reports
 2. Deductive reports

3. Step-by step reports
4. Time-sequence reports

A business report or memorandum may be defined as a simple business communication from one department head to another, one functional area to another, or from top to bottom in the organizational structure in any specific aspect of day-to-day business activities.

A project report is the report of a project undertaken by an individual or group of individuals or any functional area or any aspect or segment of any functional area of a business, industry, or society.

A dissertation is a detailed discourse or report on the subject of the study that was undertaken. This is usually used as a document to be submitted for the acquisition of higher degree from a University. A thesis, too, is a detailed dissertation which maintains a valuable proposition or hypothesis, written on the basis of a detail. This too, is used for academic purpose, as a dissertation is.

A commission's enquiry report is detailed report prepared by a commission appointed for the specific purpose of conducting a detailed study of any matter of dispute or of anything which requires a greater insight so that it may facilitate a future course of action. It is an expert opinion.

Business reports and memoranda are brief observational reports that assist one in arriving at business decisions, while project reports are detailed reports which are written with a specific purpose in mind, though it may have implications for business decisions.

The inductive patterns of report writing are one of the oldest patterns of presenting one's thoughts. Aristotle had pointed out long years ago "A whole is that which has a beginning, middle and an end". This type of report goes from the specific facts, figures, materials of research-to general conclusions, summary, recommendations, etc. Such reports use the well-tested method of starting with introductory material and progressing through factual support to conclusions.

The deductive pattern of report writing is the most accepted type of report writing in the business world. It is obviously known as the executive report, the management report, or the action-getting report. This is the pattern of presentation that goes from the general to the specific, i.e., from the more important to the less important. It tends to become more detailed or more specialized in its last pages because it is designed for a reader whose fundamental question is "what do I need to know the act or to decide?" He/she wants to answer at the very outset. The writer has a special obligation to think his/her way through to the central issue or to the main point. It is almost like a newspaper report. One who goes through the title or initial introduction would be able to get a general idea and when one goes on reading, the specific areas are unveiled. The writer has to start on common ground with the reader in the deductive pattern of report writing.

A step-by-step presentation doesn't follow any hard and fast rule, it simply presents material blow-by-blow. It is a way of presenting the events or steps in an operation frequently following one another in a point of time. But the step need not necessarily come to a conclusion or an end. A step-by-step pattern is well adapted to reports on

manufacturing operations, where a step-by-step analysis is essential. Sometimes, this pattern is well suited to progress reports, which cover only a short period of time.

The time-sequence pattern of report writing is almost like that of the step-by-step presentation; but it lays greater emphasis on the time element. It is an easy way of writing a report by merely following the pattern the research material itself offers in a sequence of time. Some readers prefer analysis based upon a sequence of time of events.

Steps in Report Writing

A few steps may be suggested which would enable the researcher to complete his/her task of writing a report clearly and cogently. These steps are:-

1. Plan the project well in advance; fix the target and the final date of completing the report
2. The time for completing data collection and data processing should be well planned, and implemented (ensure that adequate data are kept ready).
3. The time for report writing should be planned, and the task of report writing should not be put off till the last minute. At least, one-third of the total project time should be earmarked for this purpose.
4. Select a structure for the report, arrange in group the data, documents, bibliography, etc in conformity with the structure of the research report
5. Prepare an outline based on the structure, which should cover the main points and sub-points in detail.
6. Prepare a rough point-by-point skeleton for each chapter theme, and crystallize the report in a mental exercise. Do not hesitate to discuss the skeleton with somebody who is well-versed in research and writing, and who can be taken into confidence
7. In the event of any doubt, get it cleared by reading, thinking, recollecting and discussing, before going farther. Put everything in a logical sequence.
8. It is always good to the benefit of the guidance of a good guide at all stages
9. Avoid easy-going and short-cut methods and don't hesitate to write an entire first draft
10. Put the complete rough draft away for several days until you can bring a fresh mind to bear up on it. The researcher is then in a position to view it afresh and make substantial changes
11. Revise the draft thoroughly before the report is typed. Do not hesitate to eliminate any irrelevant and inappropriate portion.

Format/layout of the Research Report

A research report usually follows a fairly standardized pattern. The first step towards preparing a report should be the preparation of an outline of its major divisions and then sub-divisions in the form of headings and sub-headings of proposed chapters, sections or even paragraphs. This outline would guide the researcher in arranging material at his/her disposal in an orderly manner as it sets down the design of the report. The following outline presents the usual sequence of various sections:

- A. Preliminary section or Front Matter
 - Title page

- ☐ Approval sheet
 - ☐ Acknowledgements (if any)
 - ☐ Preface or Forward
 - ☐ Table of contents
 - ☐ List of tables (if any)
 - ☐ List of Figures (if any)
 - ☐ Abbreviations or glossary of technical words used in the report
 - ☐ Abstract or summary of the entire report
- B. Main Body of the Report
- 1) Introduction
- ☐ Background of the study
 - ☐ Statement of the problem
 - ☐ Objective of the study
 - ☐ Significance of the study
 - ☐ Assumptions and delimitations
 - ☐ Definition of important terms
- ☐
- 2) Review of related literature or Analysis of previous Research
- 3) Design of the study
- Procedures used
 - Methods of gathering data
 - Description of data gathering instruments
- 4) Presentation and Analysis of Data
- ☐ Text
 - ☐ Tables
 - ☐ Figures
- 5) Summary and Conclusions
- ☐ Brief Restatement of problem and procedures
 - ☐ Description of procedures used
 - ☐ Principles findings and conclusions
 - ☐ Recommendations for farther research
- C. The end matter
- ☐ Bibliography
 - ☐ Appendix
 - ☐ Index (if any)

Note that when you write your research report, **five major sections** of the main text of a research report are the chapters on which you organize your report.

Dear learner! For more understanding of the above three main sections of a research report, read the following discussions and examples.

A. The preliminary Section: All the components of the preliminary section are to be written on separate pages and with appropriate capital letters and centering the entire text

on the page. The title page includes the following items: the title of the report, for whom and by whom the report was prepared, the date of submission, and degree for which the report will be submitted. If it is for a journal, there is no need to include the last two items. A satisfactory title should be brief.

Acknowledgement page is a section that recognizes individuals and institutions to which you are indebted for providing credible assistance in due course of your study.

Table of contents page contains list of major classifications of the report with their corresponding page numbers. Observe the example as follows.

S. No	Contents	Page. No
1.	Acknowledgements	i.

2.	List of tables	iv
----	----------------	----

List of Tables and figures page contains the list of tables and figures you use in the report with their corresponding page number. Look at the following two examples.

Table No.	Table	Page. No
-----------	-------	----------

2.6	Age Distribution	10
-----	------------------	----

2.7.	Spatial Distribution	80
------	----------------------	----

Fig.No.	Figure	Page. No
---------	--------	----------

Fig.1.1.	Description (of the fig in precise words)	20
----------	---	----

Abstract or synopsis is a short summary. The size of the abstract varies from as few as fifty words to as large as a full page. It should exist following the list of figures on the separate page. Information to be included in a summary is Brief statement of the problem, objectives of the study, method and procedures of data collection and analysis, and major findings but recommendations are not included.

B. The main body of the research report

The introduction section normally contains several major subsections. In this part what are included in the proposal part are incorporated.

Literature review is section for documentation with insight theoretical and empirical investigation that had been carried out as related to the study at hand.

Material and methodology part includes detailed description of the manner in which decision has been made about the type of data needed for the study, the tools and approaches used for their collection, and the method by which they have been collected and justification of the method, definition of the population, the sampling techniques used with its justification, the size of the sample and the rationale for the size, statistical tools used for data analysis and the rationale will be dealt in detail in this section.

Findings and Discussions part: This is generally the longest section of the report. It is an organized presentation of the results. The objective of the findings is an exposition of what the data says rather than drawing interpretations or conclusions. In the discussion section, the researcher presents what interpretations he/she can draw from the data collected and gives the reader of the report an unambiguous interpretation.

Summary and conclusions: The summary is a brief re-statement of the essential parts including the problem, the hypothesis, description of the problem and findings. The findings state facts while conclusions represent inferences drawn from the findings.

Recommendations: This involves suggested future actions. In academic research, the recommendations are likely to be for further study to test, deepen or broaden understanding in the subject area. In applied research, for decision making, the recommendations will usually be for managerial actions rather than research actions.

C. The appended section

Appendix: complex tables, statistical tests, supporting documents, copies of forms used (questionnaires), detailed description of methodology, instructions to field works and many other evidences that may be important are incorporated in this part.

Bibliography: There should be a bibliographic section if the study makes heavy use of secondary material. For specific reference, use foot notes and endnotes placed at the conclusions of each major section rather than referring to the bibliography. The appended bibliography should contain all the works which the researcher has consulted. It should be arranged alphabetically. There may be several bibliographic entry formats. But the following points should be emphasized on the styles and formats in writing the bibliography.

- All references noted in the text, including the sources for figures and tables must appear in the reference list. (Note: You should include only those references that are cited in the paper).
- Each item in the list should include all pertinent facts about the publication: author, title of the work in question and any journal or book in which it is included, city of publication, publishing company, date, page numbers (for journal and articles).
- Don't give number for references
- When there is more than one work by a single author, place them in reverse chronological order i.e., put the most recent item first and work backward.
- Don't use lines to indicate that the name is repeated; just repeat the name.
- Format reference lists with a "hanging indent", i.e., the first line of the entry is at margin, with second and subsequent lines indented ones.
- Allow one space between the entries.
- Alphabetize references according to the author's last names. For more understanding on other aspects on how to write references, see the detail discussions made in chapter three.

8.4.5. Further Rules

I. Size and physical layout: The manuscript should be written on un-ruled paper 8.5” 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 a 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.

II. Tables and Figures

Tables:-All tables including those that appear in the appendix should be numbered consecutively to permit their easy identification by the reader. The word table is followed by its number.

Ex: Table 1: Age and Sex Distribution

Capitalize the first letter of all principal words of the table title as given in the above example. The title of the table should be at the top of the table. Regarding the source and notes of the table, they are put immediately below the table as: “Complied by the researcher” (if the data is collected by you as a researcher) or , for e.g., “Philip Kotler, Principles of Marketing, Vth edition, 2000 (if secondary data is used).

Content and placement of tables: If the table is more than half a page, it should be placed center on a separate page. If it is short and occupies less than half a page, place it on a page with textual matter. Long and detail tables should be put in the appendix of the document.

Figures:- Figure is any type of illustrative material other than table. Ex: Graph, line drawing, chart, photograph or map should be labeled as figures. Figures are labeled with the word “Fig. No”. Figures should be numbered consecutively throughout the report to permit their easy identification. . They should be numbered with Arabic numerical.

Dissemination of a report through oral presentation

The merit of orally presenting the result of a research study is that it provides an opportunity for give-and-take decisions which generally lead to a better understanding of the findings and their implications. But the main demerit of this sort of presentation is the lack of any permanent record concerning the research details and it may be just possible that the findings may fade away from people’s memory even before an action is taken. In order to overcome this difficulty, a written report may be circulated before the oral presentation and referred to frequently during discussion. Oral presentation is effective when it is supplemented by various visual aids. Use of slides wall charts, and blackboards is quite helpful in contributing to clarity and in reducing the boredom, if any. Distributing a broad outline with a few important tables and charts concerning the research results, makes the listeners attentive who have a ready outline on which to focus their thinking. This very often happens in academic institutions where the researcher discusses his/her findings and policy implications with others either in a seminar or a group discussion.

Chapter Summary

Dear learner! Let us summarize what you have already learned in this chapter. Basically, you learned about data interpretation and research report writing. Data interpretation is the task of drawing conclusion or inferences and of explaining their significance after a careful analysis of selected data is made. Data interpretation demands a researcher to have a good skill. Of all, practice and experience play great role in having an effective interpretation.

The second concept was about research report writing. Writing research report is the most crucial step in the research process as it communicates the findings of the study to supervisors and readers or any other users. But when it is badly written, it spoils the entire work.

A research report format contains three sections: The preliminary section, the main text, and the end section. The preliminary section further contains the title page, approval sheets, acknowledgments, abstract, table of contents, and list of tables and figures. The main text section of the report again contains main parts including an introduction, review of related literature, design of the study, presentation and analysis of data, and summary and conclusions parts. Finally, the end matter a research report consists of bibliography, appendices, and indices (if any).

Chapter review questions

Choose the best answer from the alternatives

1. One of the following statements is false regarding the use of interpretation of data.
 - A. It makes it possible for us to utilize collected data in various fields of activity
 - B. The usefulness of the collected data lies in its proper interpretation
 - C. It provides certain conclusions about the problem under study
 - D. None of the above
2. Insufficient and incomplete data should not be used for analysis and to make meaningful interpretations. This statement calls for the data to be
 - A. Homogeneous
 - B. Adequate
 - C. Appropriate
 - D. All
3. One of the following statements doesn't support the purpose of a research report
 - A. It communicates the various aspects of a research study
 - B. It strengthens the interpersonal relationships in the organization
 - C. The report writer should only worry about what to communicate but not who will read report
 - D. None of the above
4. One of the following types of a research report is a document submitted for the acquisition of higher degree from a University or any other higher academic institution
 - A. Thesis
 - B. project report
 - C. dissertation
 - D. A or C.
5. One of the following is incorporated in the preliminary section of a research report
 - A. Table of contents
 - B. Statement of the problem
 - C. Methods of gathering data
 - D. Recommendations for farther research
 - E. Bibliography
6. Each table that appears in the text of a report is characterized by
 - A. The word *table* is followed by its number.
 - B. Regarding the source and notes of the table, they are put at the top of the table
 - C. The title of the table should be at the bottom of the table
 - D. All of the above

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ANSWERES TO CHAPTER REVIEW QUESTIONS

CHAPTER ONE

- | | |
|------|------|
| 1. D | 4. A |
| 2. A | 5. B |
| 3. E | |

CHAPTER TWO

- | | |
|------|------|
| 1. D | 4. D |
| 2. D | 5. D |
| 3. A | 6. D |

CHAPTER THREE

- | | |
|------|------|
| 1. C | 4. D |
| 2. B | 5. A |
| 3. E | |

CHAPTER FOUR

- | | |
|------|------|
| 1. D | 5. A |
| 2. C | 6. C |
| 3. A | 7. A |
| 4. C | 8. B |

CHAPTER FIVE

- | | |
|------|------|
| 1. D | 5. C |
| 2. D | 6. D |
| 3. B | 7. D |
| 4. C | 8. E |

CHAPTER SIX

- | | |
|------|------|
| 1. D | 4. E |
| 2. A | 5. A |
| 3. D | 6. A |

7. A

8. A

CHAPTER SEVEN

1. B

4. C

2. B

5. E

3. D

CHAPTER EIGHT

1. D

2. B

3. C

4. D

5. A

