CHAPTER ONE
RESEARCH METHODS: AN INTRODUCTION

Research is most frequently used terminology in different academic institutions. Research as conscious and creative human activity involves discovering and learning new things. Where there is a problem there is always a research. It is an essential tool for understanding the events and structures of the social world. Research can mean different things to different people. People have defined research differently according to their perception. Here under we will see different definitions and perceptions of individuals about research.

1.1 Meaning of Research

"All at sea but learning to swim"

Different authors have defined the word research in many ways. ***Research commonly refers to a search for knowledge***. Some people consider research as a movement from known to unknown. It is indeed a voyage of knowledge. For some people on the other hand research implies an art of scientific investigation to the state of nature or phenomenon. Authors are increasingly adding new names and definition for different kinds of research. However, to avoid confusion and unnecessary cumbersomeness let us confine ourselves to the definitions of research given by selected authors.

Research= Re + Search
Re means again and again
Search means to find out something
Therefore, **research** is defined as the process in which a person observes phenomena again and again and collects data and analyses then he/she draws conclusion.

Hertz provided the most simplified definition of research. His definition referred research to the original and creative activities. According to him, Research is the application of human intelligence in a systematic manner to a problem whose solution is not immediately available.

Woody on the other hand defined research as an activity comprises of defining and redefining problems, formulating hypothesis or suggesting solutions; collecting, organizing and evaluating data; making deduction and reaching at conclusion to determine whether they fit the formulated hypothesis.

An author called **Klopsteg** gives the most comprehensive definition of research. According to him; 'Research is original and creative intellectual activity, carried out in the laboratory, the library or in the field which endeavors to discover new facts and to apprise and interpret them properly in the light of previous knowledge'.

With constantly increasing understanding, research revises previously accepted conclusion, theories and laws, and makes new application of its findings. Whether it seeks to extend knowledge for its own sake or to achieve results with specific economic or social value, its raison de'tre (the most important reason) is its contribution to human welfare.

According to **Klopsteg**, research is carried out not only in the laboratory but also it can be carried out in different places like in the library and in the field as well. Research is not only original and creative activity. It will not always discover new facts. It can also revise and verify the validity of previously accepted facts, theories and principles, which is the task of academic or basic research.

Box 1 Fundamental research terminologies

- Research is a scientific or critical investigation aimed at discovering facts and interpreting data or applying the evolved techniques in solving certain problems and give answers to research questions. It is an organized and systematic way of finding solutions to problems.
- Research is an organized activity or it is done in a planned procedure so that it gives the most appropriate answers to problems or questions.
- Research is a scientific method or a technique for investigating phenomena and acquiring new knowledge.
- Research is a quest for knowledge through diligent search or investigation or experimentation aimed at the discovery and interpretation of new knowledge.
- Research is a systematic body of procedures and techniques applied in carrying out investigation or experimentation.

1.2 Motivation of Doing Research

Research is not a trouble-free duty rather it is time consuming, tiresome and expensive undertaking. Despite these all difficulties many people especially in academic institute would like to carry out research at least once in their life.

What are the possible motives of individuals to undertake research work? The possible motives for doing research can be either one or a combination of the following:

a) **Desire to get degree with its consequential benefit**: The graduate and postgraduate students are required to carry out research project as a partial fulfillment to obtain their Master and Ph.D. Degree. Research is therefore, a pre-requisite to complete their study.

b) **Desire to get respect and promotion (to own respect in society):** In academic and research institutions publication is crucial for promotion and academic rank. This implies an individual should carry out a research activity and publish his/her findings in scientific or international journal in order to get respect and academic rank.

c) Desire to face a challenge in solving the unsolved problem: Concern over a particular problem initiates a researcher.

d) Desire to get intellectual joy of doing some creative work: Doing or participation in some creative activity will give some professional satisfaction to many individuals. Research will give this opportunity.

e) Directive of government: Government sometimes gives directives to its employees to carry out a particular study and investigation for better decision-making ground**.** Ideally any policy before implementation requires detail study and analysis of its impact on different parts of the society.

f) **Employment condition.** Some employers set as criteria at least one publication in international journal.

The purpose of research is to display the truth by systematic methods. It may involve the manipulation of concepts or symbols in order to correct or verify the existing knowledge or ideas so that an operational generalization may be made in the shape of a theory. A research may aim at the following things:

- To find new generalizations with old data;
- To know old conclusions with new data;
- To attempt to reach more conclusions from the same set of data;
- To put forward an entirely original idea or theory, or to discover an unexplored horizon of knowledge;
- To find or to resolve contradictions existing in the area of study.

Any research has three major components. These are:

- **Problem;**
- **Evidence and**
- **Conclusions**.

If one of the three components are lacking, the research is not complete.

1.3 Objectives of Research

Any research activity is designed to discover and answer to questions through the application of scientific procedure. It is an activity aimed at finding out the truth which is hidden and which has not been discovered yet or to verify or reject that the existing phenomenon (theory, principle or law) accepted as true.

The research has the following three objectives:

1. Theoretical objective
2. Factual objective and
3. Application objective.

1. Theoretical Objective

Those researches whose objectives are theoretical formulate the new theories, principles or laws. Such type of research is explanatory because it explains the relationships of certain variables. These researches contribute some basic knowledge to the human knowledge. The researches in different disciplines *i.e.*, Physics, Chemistry, Mathematics etc. have the theoretical objective.

2. Factual Objective

Those researches whose objective is factual find out new facts. This objective is by nature descriptive. These researches describe facts or events which happened previously. Such type of research is done in history.

3. Application Objective

The research having application objective does not contribute a new knowledge in the fund of human knowledge but suggests new applications. By application we mean improvement and modification in practice. For example if anyone gives a new application of electricity then such type of research has application objective.

Box 2 Objectives of research (summary)

Though each research study has its own specific objectives, any research have the following common (general) objectives:

- To generate new knowledge, principle and scientific law;
- To review and synthesize existing knowledge. That is, to verify the validity of the previous work;
- To investigate some existing situation or problem;
- To explain new phenomenon;
- To examine the cause of the problem;
- To examine the nature of the problem;
- To provide solution to a problem;
- To construct or create a new procedure and new system;
- A combination of any one of the above.

1.4 Characteristics of Research

Research requires:

- Collection and interpretation of data;
- Expertise i.e., skill necessary to carry out investigation, search the related literature and to understand and analyze the data gathered;
- Courage;
- Patient and unhurried activity;
- The quest for answers to unsolved problems;
- Gathering new data from primary sources or using existing data for a new purpose.

Research activities are also characterized by:

- It is carefully designed procedures;
- It is guided by specific problem, question, or hypothesis;
- It is directed towards the solution of a problem;
- It is based upon observable experience or empirical evidence;
- It demands accurate observation and description;
- It is objective and logical - applying every possible test to validate the data collected and conclusions reached;
- It is carefully recorded and reported;
- It is patient and unhurried activity;
- It is not as exact as research in physical science.

1.5 Types of Research

Generally research can be classified on the basis of the following traits.

- On the basis of the outcome of the research;
- On the basis of the objectives (the reason why a research is conducted);
- On the basis of the process of research;
- On the basis of the environment in which the research is carried out;
- On the basis of the time required to complete the research.

I. On the basis of the **goal** of the research**:** Whether the research tries to solve a particular problem or makes a general contribution to the knowledge, research can be:

a) Fundamental Research
b) Applied Research

a) Fundamental (Basic or Pure or Academic) Research

Such research is aimed at investigating or search for new principles and laws. It is mainly concerned with generalization and formulation of a theory. Fundamental research is organized only for the attainment of knowledge and truth. With change of time and space, it is necessary to make a change in the fundamental principles in every branch of science; thus, this type of research also verifies the old established theories, principles and laws.

In general, fundamental research is concerned with the theoretical aspect of science. In other words, it studies the laws of nature, without or regardless of the immediate application of its findings.

The major aims of basic research include:

- Obtaining and using empirical data to formulate, expand or evaluate theory;
- Discovery of knowledge solely for the sake of knowledge.

Hence, basic research may take any of the following forms:

- **Discovery**: where a totally new idea or explanation emerges from empirical research which may revolutionize thinking on that particular topic.
- **Invention**: where a new method or technique is created;
- **Reflection**: where an existing theory, technique or group of ideas is re-examined possibly in a different organizational or social context.

E.g.

- The relationship between crime and economic status is an example of pure (academic) research.
- Darwin Theory of Evolution
- Newton's Law of Motion
- Einstein Theory of Relativity

b) Applied Research

Applied research is designed to solve practical problems of the world, rather than to acquire knowledge for knowledge's sake. The purpose of applied research is about testing theories, often generated by pure science, and applying them to real situations, addressing more than just abstract principles. Applied scientific research can be about finding out the answer to a specific problem, such as 'Is global warming avoidable?' or 'Does a new type of medicine really help the patients?'

The primary purpose of applied research is discovering, interpreting and the development of methods and systems for solving practical problems on a wide variety of real life situations of our world and the universe.

It is a research aimed at finding solution for an immediate problem facing a society or a group. The results of such research would be used by either individuals or groups of decision-makers or even by policy makers. While pure research discovers principles and laws, applied research discovers their application in solving some social, economic or any other problems.

E.g. The improvement of safety in the working place
The reduction of wastage in the working places is example of applied research.

II. On the basis of the **objective** (the reason why a research is conducted) research can be:

a) Exploratory Research
b) Descriptive Research
c) Analytical Research

a. Exploratory Research (Pilot Survey)

It is also called preliminary research. As its name implied, such research is aimed at discovering, identifying and formulating a research problem and hypothesis. When there are few or no studies that can be referred to exploratory or preliminary research is needed.

Goal of preliminary research is to generate many ideas:

- To gain background information and better understand and clarify a problem
- Can be used to develop hypotheses and to develop questions to be answered
- Can be used to help a researcher understand how to measure something.
- Is less formal, sometimes even unstructured.
- Develop tentative theories and conjectures.
- Become familiar with the basic facts, people and concerns involved.
- Formulate questions and refine issues for future research.
- Used when little is written on an issue.
- It is the initial research.

b. Descriptive Research

Descriptive research sets out to describe and to interpret **what is**. It looks at individuals, groups, institutions, methods and materials in order to describe, compare, contrast, classify, analyze and interpret the entities and the events that constitute the various fields of inquiry. It aims to describe the state of affairs as it exists at present.

Descriptive research, therefore, involves a variety of research methods to achieve its goal. The methods that come under descriptive research are:

- Survey;
- Correlation studies
- Observation studies and
- Case studies

Purpose: Description of the state of nature or affairs, as it exists at present. In social science and business research, we often use the term **ex-post facto research for descriptive research**.
Main feature: researcher has no control over the variables; he/she can only report what has happened or what is happening.

E.g. what is the absentee rate in a particular office?

- What is the qualification of different groups of employment?
- Frequency of shopping
- Preferences of people

Ex-post facto studies also include attempts by researchers to discover causes though they cannot control the variables.

Goals of Descriptive Research

- To provide an accurate profile of a group
- To describe a processes, mechanism or relationship
- To provide a verbal or numerical picture about a phenomenon
- To find information to stimulate new explanations
- To present basic background information on a context
- To create a set of categories or classify types
- To document information that contradicts prior beliefs about a subject

c. **Analytic Research/Explanatory Research**

Analytical Research is aimed at establishing the cause and effect relationship between variables. It is primarily concerned with testing hypothesis and specifying and interpreting relationships, by analyzing the facts or information already available. Thus, explanatory or analytical research aims to understand phenomena by discovering and measuring causal relations among them. That is, explanatory research looks for causes and reasons.

Main features

- Goes beyond simple description of the state of nature;
- It involves theory testing or elaboration of a theory;
- Used mostly in basic research;
- Research that identifies causes and effects of social phenomena (e.g., research that suggests that Internet use hurts or helps other forms of social interaction.);
- When a researcher encounters an issue that is already known and have a description of it, you may begin to ask "why" things are the way they are;
- Uses facts or information already available, and analyzes it to make a critical evaluation of the material;
- Not only describe the characteristics, but also it analyzes and explains why and how it happened or is happening;
- The information or facts used here can be either Qualitative or Quantitative.

Goals of analytical research

- To determine the accuracy of a principle or a theory;
- To find out which competing explanation is better;
- To advance knowledge about an underling process;
- To link different issues or topics under a common general statement;
- To build and elaborate a theory so it becomes more completes;
- To extend a theory or principle into new areas or issues;
- To provide evidence to support or refute an explanation or prediction.

E.g.

- How can we reduce the numbers of complaints made by students?
- How can we expand the range of our services?
- How can we improve the delivery times of our products?

III. On the basis of the **approaches** of research, research can be:

a) Qualitative Research
b) Quantitative Research

a) Qualitative Research

Qualitative research involves studies that do not attempt to quantify their results through statistical summary or analysis. Qualitative research seeks to describe various aspects about behavior and other factors studied in the social sciences and humanities. In qualitative research data are often in the form of descriptions, not numbers.

It is thus a type of empirical enquiry that entails purposive sampling for gathering data. It typically involves in-depth interviews, group discussions, artifact studies, projective techniques, and observations without formal measurement. A case study, which is an in-depth examination of one person, is a form of qualitative research. Qualitative research is much more time consuming, but provides more richness to the data. In epistemological terms, qualitative research is identified with phenomenological and interpretative research.
It aims to help us to understand the world in which we live and why things are the way they are. It is concerned with the social aspects of our world and seeks to answer questions about:

- Why people behave the way they do;
- How opinions and attitudes are formed;
- How people are affected by the events that go on around them;
- How and why cultures have developed in the way they have.

Qualitative research is concerned with finding the answers to questions which begin with: why? How? in what way?

b) Quantitative Research

Quantitative research is the systematic and scientific investigation of quantitative properties and phenomena and their relationships. The objective of quantitative research is to develop and employ mathematical models, theories and hypotheses pertaining to natural phenomena. The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of an attribute.

Quantitative researchers favor methods such as surveys and experiments, and will attempt to test hypotheses or statements with a view to infer from the particular to the general. This approach typically concentrates on measuring or counting and involves collecting and analyzing numerical data and applying statistical tests.

It is based on the measurement of quantity or amount. It is applicable for phenomenon that can be expressed in term of quantity. Quantitative research is more concerned with questions about: how much? How many? How often? To what extent? Etc.

The main characteristics of qualitative and quantitative research are summarized in the following table.

Characteristics	Qualitative Research	Quantitative Research
• Typical Data Collection Methods	Participant observation, semi-structured interviews, introspection.	Laboratory observations, questionnaire, schedule or structured interviews.
• Formulation of Questions and Answers	Open loosely specified questions and possible answers. Questions and answers are exchanged in two way communication between researcher and research participant.	Closed questions and answer categories to be prepared in advance.
• Selection of Respondents	Information maximization guides the selection of respondent. Every respondent may be unique (key person).	Representativeness as proportion of population **N**. Sample selection, sample size according to assumptions about distribution in population **N**. Respondents should be directly comparable.
• Timing of Analysis	Parallel with data collection	After data collection
• Application of Standard Methods of Analysis	Are rarely used. Methods of analysis are formulated during the data collection process.	Standard statistical methods are frequently used
• Typical forms of Analysis	Critical analysis and interpretation of source materials. Selection, systematizing and summarizing interview transcripts and observations.	Cross tabulations, correlation analysis and tests of significance on numerical data
• The Role of Theories in the Analysis	Existing theories are typically used only as point of departure for the analysis. Theories are further developed by forming new concepts and relations. The contents of the new concepts are studied and illustrated. Practical application of theory is illustrated by cases.	A-priori deducted theories are operationalised and tested on data. The process of analysis is basically deductive.

IV. On the basis of the **environment** in which the research is carried out research can be:

a) Field Research
b) Laboratory Research
c) Simulation Research

a) Field Research: is a research carried out in the field. Such research is common in social science, agricultural science, history and archeology.

b) Laboratory Research: is a research carried out in the laboratory. These are commonly experimental research. Such researches are common in medical science, agriculture and in general in natural sciences.

c) Simulation Research: Such research uses models to represent the real world. Simulation is common in physical science, economics and mathematics.

V. On the basis of the **time** required to complete the research, research can be

a) **One-time Research or Cross-Sectional Research**; It is a research limited to a single time period.
b) **Longitudinal Research**: Such research is also called on-going research. It is a research carried out over several time periods.

Classification of research by field of studies:

Research can also be classified based on field of study. Therefore, there are:

- Natural science research;
- Social science research;
- Educational research;
- Behavioral science research;
- Health science research, *etc*.

1.6 Research and Scientific Method

What is the relationship between science and research? The word **science** is derived from the Latin word **Scire** meaning to know. Science is difficult to define primarily because people often confuse the content of science with its methodology. Science has no particular subject matter of its own…but a distinct methodology. Science, in this sense, refers to any systematic and highly skilled means of acquiring knowledge. **Research** is a **scientific method** or a **technique** for investigating phenomena and acquiring new knowledge. To be termed **scientific**, **a method of inquiry must be based on gathering observable, empirical, and measurable data subject to specific principles of reasoning.**

The philosophy common to all research methodology and technique is called **Scientific Methods**.

Basic Postulates in Scientific Method

- ♦ It relies on empirical evidence;
- ♦ It utilizes relevant concepts;
- ♦ It is committed to only objective considerations;
- ♦ It presupposes ethical neutrality;
- ♦ It results into probabilistic predictions;
- ♦ The methodology is made known.

As Pearson (1968) put it, "the scientific method is one and the same in the branches (science) and that method is the methods of all logically trained minds".

The scientific method of knowing is the scientific research, and its goal is the discovery of regularities of nature and their representation in theories from which predictions can be made.

The steps in the scientific method guide researchers in planning, conducting, and interpreting research studies. Scientific research follows logical steps, which include:

- Defining the problem;
- Making tentative explanations;
- Gathering information;
- Testing the validity of the hypothesis;
- Making conclusions as to whether the hypothesis can be accepted or rejected.

Scientific methods:

- find general rules,
- collect objective evidences,
- make testable statements,
- adopt a skeptical attitude about all claims,
- are creative,
- are public, and
- are productive.

Steps in Scientific Method

As we have said scientific method is the philosophy common to all research methodology and technique in any research in any branch of science. The steps in scientific methods are summarized as follows.

a) **Observation:** the first step in the scientific method is a careful observation of the subject matter of research.
b) **Recording**: The next step in scientific method is a careful recording of all information (data) obtained in the first step, i.e., observation.
c) **Classification**: the collected data (information) have to be classified and organized. This is a serious step; according to "the classification of facts, the recognition of their sequence and relative significance, is the function of science." The classification implies systematically arranging and organizing the recorded data on the logical basis so that they will become viable for the analysis and to make generalization.
d) **Generalization:** It is an extension of general laws and principles on the basis of the pattern exhibited by the classified material. This general law is known as scientific law.
e) **Verification:** the scientific method does not stop only at the formulation of general law. The general principle must be also verified. The validity of scientific principles can be confirmed by examination.

Forms of Scientific Methods

There are six primary forms of scientific methods.

1) **Induction**: the movement of knowledge from particular facts to general rule or principle. To generalize based on our knowledge from a particular event or assessment.
   - E.g., Socrates is mortal and Socrates is a man;
     Therefore, man is mortal.
2) **Deduction**: a movement in knowledge from a general rule to a particular case.
   - E.g., Man is mortal and Socrates is a man;
     Therefore, Socrates is mortal
3) **Historical**: historical method is a back ward movement in knowledge to trace the cause of a phenomenon. Darwin theory of evolution and Marx's law of economic determinism are example of historic forms of scientific method.
4) **Comparative**: This method is used for the analysis and comparison of two contemporary (coexisting and present) phenomenon. It is always undertaken in order to discover new facts or relations. Studies of two government or political system
5) **Structural**: a study of what a things, what are its outline and significant feature is a structural study (the composition of a thing). Anatomy is a structural study
6) **Functional**: in contrast to the structural method, functional method studies the processes and their cause, that is, how and why of a thing. Physiology is a good example

1.7 Research Methods versus Research Methodology

In this lecture note most frequently we come across to the term research methods and research methodology. Some literature use this terms interchangeably. But your research methodology is different to your research methods. To avoid confusion the definition and differences of these terms are given as follow. Their usage throughout the text is based on these definitions.

Research Methods: is a particular research technique or way to gather evidence about phenomenon. Or it refers to the tools/instruments we use in performing research operation. Therefore, research methods are specific research tools we use in research projects to gain fuller understanding of phenomena. That is, the range of approaches used in research to gather data which are to be used in research to gather data which are to be used as a basis for inference and interpretation, for explanation and prediction.

Example: questionnaires (surveys), interviews, participant observations.

Research Methodology: is the philosophy or the general principle which will guide your research or all those approaches and techniques that are used in conducting a particular research. Research methodology; thus, refer to the techniques researchers use in performing research operations.

Research methodology can be put into three groups:

- The first group include approaches or techniques of data collection;
- The second group consists of those statistical techniques used to established relationship between variables;
- The third group consists of those techniques involved in evaluating the accuracy of the result obtained.

Research methodology is the science and philosophy behind all research.

It is necessary for the researcher to know not only the research methodology how to conduct research but also the methods. That is, researcher not only need to know how to develop certain indices or test, how to calculate the mean, the mode, the median or the standard deviation or chi-square or in general how to apply particular research techniques, but they also need to know which of these methodology or techniques, are relevant and what would they mean and indicate the way. Researcher also needs to understand the assumption underlining various techniques.

1.8 Who does Research?

A very wide array of organizations and individuals do research. These range from the rather obvious, such as market research companies, through to the smallest government departments which need to know the impact of their work in the community. The following is just a small sample of the kinds of organizations and individuals who conduct research:

- Government institution
- Manufacturing or service companies
- Research institution
- Consultancy companies
- Academic institution
- Voluntary organizations
- Advertising agencies
- Market research companies
- **And of course you, students!**

The types of research each of the above undertake (descriptive, explanatory and predictive) will totally depend on the nature of the research problem they are confronted with.

1.9 Research Processes

Before starting the details of research methods, it is appropriate to have a brief overview of the research processes. Research processes consist of a series of steps, which are necessary to successfully carry out research activities.

The research processes consist of a number of closely related activities. These activities (steps) can overlap continuously rather than following a strictly prescribed sequence. The first step can determine the nature of the last step to be undertaken. These steps are not separate and distinct. They do not necessarily follow each other in any specific order.

However, the following order of steps provides a useful procedural guideline regarding the research processes.

- Identification and Formulating the research problem
- Developing objectives or working hypothesis
- Extensive literature survey or review
- Preparing the research design
- Determine sample design
- Collecting data
- Analysis of the data
- Hypothesis testing
- Generalization and interpretation
- Reporting the result

1.10 Qualities of Good Research

- Good research is **systematic**: Research is structured with specified steps to be taken in specified sequences in accordance with the well-defined rules. (These characteristics will not rule out creative thinking but is certainly does reject the use of guessing, and intuition in arriving at conclusion.
- Good research is **logical**: The research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out a research.
- Good research is **empirical**: It implies the research is related basically to one or more aspects of a real situation and deal with concrete data that provides a basis for external validity to research results
- Good research is **replicable**: This character allows the result to be verified by replicating the study and thereby building a sound basis for decision.

Box 4 Qualities of Good Research

Qualities of a Good Research

- Systematic Replicable
- Logical Creative
- Empirical Use of multiple methods

Then, what is bad research?

- The opposites of what have been listed above & discussed.
- Looking for something when it simply is not to be found.
- Plagiarizing other people's work.
- Falsifying data to prove a point.
- Misrepresenting information and misleading participants.

Good research requires:

- The scope and limitations of the work to be clearly defined.
- The process clearly explained => it can be reproduced & verified by other researchers.
- A thoroughly planned design that is as objective as possible.
- Highly ethical standards be applied.
- All limitations be documented.
- Data be adequately analyzed and explained.
- All findings be presented unambiguously and all conclusions be justified by sufficient evidence

1.11 Ethical Considerations

Why do we need ethical approval?

Before you embark on research with human subjects, you are likely to require ethical approval. You may wonder why all this bureaucracy is needed. But history shows us that prior to the development of ethical and human rights over the last 40 years, patients' rights were often ignored and many individuals were seriously harmed by medical experimentation.

Atrocities committed during World War II in the Nazi Germany which led to the 1947 Nuremberg Code of practice and in turn the 1964 Declaration of Helsinki Tuskegee Syphilis Study in USA (1932-1970s) to study the long-term effects of untreated syphilis- 400 men out of the 600 participants were never told about the infection and were never treated despite the fact that treatment became available.

Research studies should be judged ethically on three sets of criteria, namely:

- Ethical principles,
- Ethical rules.

The latter is often neglected but is important since if a study is poor or the sample size insufficient then the study is not capable of demonstrating anything and consequently could be regarded as unethical.

Ethical Principles

- **Autonomy** - we ought to respect the right to self-determination. In research autonomy is protected by ensuring that any consent to participate in the study is informed or real. This means it is not enough to explain something about your project to a particular subject, it is the understanding and free choice whether or not to participate that is the key issue. There must be no coercion of any sort.
- **Non-Maleficence (do not harm)**- we ought not to inflict evil or harm. This principle states that we may not inflict harm on or expose people to unnecessary risk as a result of our research project. This is particularly important if our subjects may not be competent in some way, such as, the ability to give informed consent.
- **Beneficence -** refers to the ethical obligation to maximize benefits and to minimize harms. We ought to further others' legitimate interests. This is the principle that obliges us to take positive steps to help others pursue their interests. These interests clearly have to be legitimate.
- **Justice** - we ought to ensure fair entitlement to resources. This principle is concerned with people receiving their due. This means people should be treated equally in every way since not all people are equally competent or equally healthy.

Ethical Rules

The ethical rules of research, like principles, are not absolute in that one may override another although clearly this must be justified. These rules are essential for the development of trust between researchers and study participants. Like the ethical principles on which the ethical rules are based on:

a) **Veracity:** All subjects in any research project should always be **told the truth**. There is no justification for lying, but this is not the same non-disclosure of information should it, in particular, invalidate the research.
b) **Privacy:** When subjects enroll in a research study, they grant access to themselves, but this is not unlimited access. Access is a broad term and generally includes viewing, touch or having information about them.
c) **Confidentiality:** Although someone may grant limited access to him or herself, they may not relinquish control over any information obtained. Certainly, no information obtained with the patient's or subject's permission from their medical records should be disclosed to any third person without that individual's consent. This applies to conversations too.
d) **Fidelity:** Fidelity means keeping our promises and avoiding negligence with information. If we agree for example, to send a summary of our research findings to participants in a study we should do so.

Informed Consent is a process by which a study participant voluntarily confirms his/her willingness to participate in a particular study. The main goal of informed consent is to make sure that the study participant has understood and make choices freely whether to begin or continue participation in a study.

Essential elements of informed consent:

- Information
- Comprehension
- Autonomy of study participants and consent

Applying to Ethics Committee

Remember that the key questions that the Ethics Committee will be asking are:

- Is the research valid?
- How important is the research question?
- Can the question be answered?
- Is the welfare of the research subject under threat?
- What will participating involve?
- Are the risks necessary and acceptable?
- Is the dignity of the research subject upheld?
- Will consent be sought?
- Will confidentiality be respected?

CHAPTER TWO

IDENTIFYING, DEFINING AND JUSTIFYING THE RESEARCH PROBLEM

In research process, the first step is identifying, properly defining and justifying the research problem. The researcher first must find any environmental, social, economic, demographic problems and formulate it into research problem. The problem identified initially may be stated in broad general way and then gradually the ambiguity will be resolved. The feasibility of a possible particular solution has to be considered before formulating the problem. The best way of understanding a problem is to discuss it with colleagues or those having some experience in the matter.

2.1 Problem Identification

Finding a problem is not hard, but identifying one for the purpose of research is not always easy. One of the most important tasks of research is to identify and define clearly the problem you wish to study. If you are uncertain about the research problem, if you are not certain in your own mind about what you want to study, you may be sure that others who read your proposal will also be uncertain. A well-defined problem leads to naturally to the statement of research objectives, to the hypothesis, to a definition of key variables and to a selection of methodology for measuring variables. A poorly defined research problem leads to confusion.

What is a Research Problem?

All research is set in motion by the existence of problem. A problem is a perceived difficulty, a feeling of discomfort with the way things are, a discrepancy between what someone believes should be and what is. While problems are the initiating force behind research, not all problems require research. Whether a problem requires research depends on three conditions:

- There should be a perceived difference or discrepancy between what it is and what it should be;
- The reason(s) for this difference should be unclear (so that it makes sense to develop a research question); and
- There should be more than one possible and plausible answer to the question (or solution to the problem).

The last point is important. If there is only one possible and plausible answer to the question about the discrepancy, then a research situation does not exist. Consider the following example below.

Example of non-research problem

- **Problem Situation**: A recent survey in district A found that 1000 women were continuous users of contraceptive pills. But last month's service statistics indicate that none of these women are using contraceptive pills.
- **Discrepancy**: All 1000 women should be using contraceptive pills, but all 1000 women are not using contraceptive pills.
- **Problem Question**: What factor/s is/are responsible for 1000 women discontinuing their use of contraceptive pills?
- **Answer**: A monsoon flood has prevented all new supplies of pills reaching district A and all old supplies have been exhausted.

In the above example, a problem situation exists, but the reason for the problem is already known. Therefore, assuming that all the facts are correct, there is no reason to conduct research on the factors associated with pills discontinuation among the 1000 women. On the other hand, there may very well be a need to conduct research on the question of why the supply and logistics system is incapable of providing contraceptives to women during the monsoon.

- **Problem situation:** In district **" Y "** a report showed that in the first month there were 500 children under one year old who started immunization, but at the end of the year it was found out that there were only 25 children who completed their vaccination.
- **Discrepancy:** All the 500 children at district **"Y "**should have completed their vaccination but only 5% out of those who started vaccinations have completed.
- **Problem (research) question:** why only 5% of the children completed their vaccination?
- **Definite answer:** Out of the 1 hospital, 2 health centers and 10 health stations found in district **"Y"** only 2 health stations were functioning, the rest were closed due to insecurity in the area.

In the above example, assuming that all the given facts are true, there is no need of undertaking a research, since definite answer is obtained to the problem situation.

Example 2:

- **Problem situation**: In district "Z" (population 150,000) there are 2 health centers, 1 hospital and 15 health stations and all of them function smoothly. However, at the end of the year it was found that the EPI coverage was only 25%.
- **Discrepancy**: Although district "Z" had 100% availability of health services and at least 80% of the children should have had full vaccinations the EPI coverage was only 25% as seen above.
- **Problem question**: What factors influence the low EPI coverage in district "Z"?
- **Possible answers:**
  - ✓ Mothers might have problems for not attending in the EPI sessions.

- ✓ The MCH, EPI, OPD, CDD, etc… programmes might not have been integrated; hence children might have missed opportunities in getting immunization.
- ✓ The follow up of defaulting children might not be effective and other reasons.

Thus, the above problem situation is researchable.

Problem formulation from the researcher point of view represents translating the managers, social and other problems in to a research problem. In order this to happen the researcher must understand the origin and nature of the management (economic, environmental, and etc.) problems and then be able to rephrase it into meaningful terms from analytical point of view.

a. Criteria for selecting a research topic

1. Relevance: The topic you choose should be a priority problem. Questions to be asked include:
   - How large or widespread is the problem?
   - Who is affected?
   - How severe is the problem?

2. Avoidance of duplication: Investigate whether the topic has been researched. If the topic has been researched, the results should be reviewed to explore whether major questions that deserve further investigation remain unanswered. If not, another topic should be chosen.

3. Feasibility: Consider the complexity of the problem and the resources you will require to carry out the study.

Thought should be given first to personnel, time, equipment and money that are locally available. In situations where the local resources necessary to carry out the project are not sufficient, you might consider sources available at the national level.

4. Political acceptability: It is advisable to research a topic that has the interest and support of the authorities. This will facilitate the smooth conduct of the research and increases the chance that the results of the study will be implemented.

5. Applicability of possible results and recommendations

Is it likely that the recommendations from the study will be applied? This will depend not only on the blessing of the authorities but also on the availability of resources for implementing the recommendations.

6. Urgency of data needed

How urgently are the results needed for making a decision? Which research should be done first and which can be done late?

7. Ethical acceptability

We should always consider the possibility that we may inflict harm on others while carrying out research. Therefore, it will be useful to review the proposed study.

b) Scales for rating research topics

Relevance

1 = Not relevant
2 = Relevant
3 = very relevant

Avoidance of duplication

1 = Sufficient information already available
2 = Some information available but major issues not covered
3 = No sound information available on which to base problem-solving

Feasibility

1 = Study not feasible considering available resources
2 = Study feasible considering available resources
3 = Study very feasible considering available resources

Political acceptability

1 = Topic not acceptable
2 = Topic somewhat acceptable
3 = Topic fully acceptable

Applicability

1 = No chance of recommendations being implemented
2 = Some chance of recommendations being implemented
3 = Good chance of recommendations being implemented

Urgency

1 = Information not urgently needed
2 = Information could be used but a delay of some months would be acceptable
3 = Data very urgently needed for decision-making

Ethical acceptability

1 = Major ethical problems
2 = Minor ethical problems
3 = No ethical problems

N.B. The above rating should be based on the existing data and not on mere assumptions.

Exercises

1. In a certain district (population, 150,000), sanitary conditions are very poor (only 5% of households have latrines) and diseases connected with poor sanitation, such as, gastroenteritis and worms are very common. The Ministry of Health has initiated a sanitation project that aims at increasing the number of households with latrines by 20% each year. The project provides materials and the population should provide labour. Two years later, less than half of the target has been reached.
   - State the discrepancy, research question and the possible answers. Is this problem situation researchable?

2. Go to the nearby health institution and identify three health problems. Discuss about these health problems and rate them based on the selection criteria. When rating these problems based on the criteria, use the rating scale indicated at the bottom of the table (you can also refer to the "Scales for rating research topics" presented in section 2.4b). You can do the exercise in small groups. Which topic do you select for research? Defend your first choice in a plenary session.

Rating Sheet

Criteria for Selecting a Research Topic	**Proposed Topic**		
	Health Problem I	**Health Problem II**	**Health Problem III**
Relevance			
Avoidance of Duplication			
Feasibility			
Political Acceptability			
Applicability			
Urgency of data needed			
Ethical acceptability			
Total			

Rating scale: 1 = low, 2 = medium, 3 = high

2.2 Problem Definition

Identifying a problem situation is the first essential step in designing a research proposal, but it must then be followed by a process of problem definition. The research problem identified must now be defined in terms of its occurrence, intensity, distribution and other measure for which data are already available. The aim is to determine all that is currently known about the problem and why it exists. While it is always possible to guess why a problem exists, guesses are often wrong and usually they do not provide a firm basis for designing a research study. A far better to define a problem situation is to review relevant literature, examine current service statistics, seek educated opinions from persons concerned with the problem, and obtain probable reasons for the problem from social, economic or demographic theory. A careful review of existing sources of information on a problem help the investigator determine:

- **Incidence and Prevalence**: How widespread is the problem? What is the distribution? How often does it occur?
- **Geographic Areas Affected**: It is important to know if there are particular geographic areas affected by the problem. Does the problem generally occur in rural areas only? Does it also affect cities? Is the problem restricted to mountain areas or coastal areas?
- **Characteristics of Population Groups**: Are there special population groups affected by the problem; such as mothers, children, teenagers or women etc.
- **Probable Reasons for the Problem**: What is the current thinking about the reasons for the problem? Is there general agreement among many people about the reasons, or are there many different, conflicting views?
- **Possible Solutions**: What types of solutions have been tried in the past? How successful have past efforts been? What approaches to solving the problem seem to work? What approaches seem not to work?
- **Unanswered Questions**: what seem to be the unanswered questions about the problem? What aspects of the problem need to be researched further?

2.2.1 Techniques involved in defining a problem

The research problem should be defined in a systematic manner. The technique involved in defining a research problem has a number of steps, which should be under taken one after another.

- **Statement of problem in a general way**: First of all the problem should be stated in a broad general way keeping with some practical, scientific and intellectual interest. For that purpose the researcher must immerse him completely in the subject matter, which he wishes to pose a problem.

In social science it is advisable to do some field observation and / or preliminary survey (pilot survey). Then the researcher can himself state the problem or can seek guidance of the subject expert.

- **Understanding the nature of the problem**: the next step is to understand clearly the nature and the origin of the problem. The best way of understanding the problem is:
  - ✓ To discuss with those who first raised the problem in order to know how the problem originally come in view.

- ✓ To discuss it with those who have a good knowledge of the problem concerned or similar other problem.

- **Survey the available literature**. All available literature concerning the problem must be studied and examined before defining research problem. This means the researcher must be familiar with the relevant theory in the area. Theory has got the following role in overall research studies:

  - ✓ Theory provides patterns of the interpretation of data
  - ✓ It links on study with the other
  - ✓ It supplies frameworks within which concepts and variables acquire special significance.
  - ✓ It allows us interpret the large meaning of our findings for ourselves and others
  - ✓ Reports and records and other literature in the concerned area
  - ✓ Review research works undertaken on related problem. This is important especially to learn what data and other material have been used and are available for operational purpose Knowledge about these all will help the researcher to narrow the problem down him/her self.

Generally, survey literature will enable researcher to know:

- ✓ If there are certain gap in the theory
- ✓ Whether the existing theory applicable to the problem and consistent with each other.
- ✓ Whether the findings of the research do or do not follow a pattern consistent with the theoretical expectation.
- ✓ Study on a related problem is also useful for indicating the type of difficulty that may be encountered in the present study.

- **Developing ideas through discussion***:* Discussion on a problem produces useful information. Various new ideas can be discovered and developed through it. The researcher should discuss his problem with colleagues and others who have enough experience in the same area. Such practice is called '**experience survey**". Peoples with rich experience are in a position to show the researcher different aspects of his proposed study and their advice and comments are usually of high values.
- **Rephrasing the research problem (reformulation of the problem):** Finally the researcher at this stage should be able to reformulate the problem that has been stated in broad and general way in to working proposition. The researcher should narrow and break down the problem into its components variables and relationship. That is, problem should be expressed as:
  - ✓ a relationship between two or more variable
  - ✓ the problem should be stated either in question form or hypothesis form
  - ✓ Question form is appropriate mostly when the research is descriptive in nature. What important is that when a researcher state the problem in question form the formulated problem should be free from ambiguity and the relationship among variables should be clearly expressed.

Example:

- ✓ Does a relationship exist between income of university students and score on their exams?
- ✓ Is there a relationship between employees' age and their productivity?
- ✓ Does a relationship exist between the men circumcision and sensitivity to HIV virus?

In the above examples, the study's main elements are identified in reasonably clear fashion.
The following points must be considered while redefining the research problem:

- ✓ Technical terms and words or phrased, with special meanings used in the statement of the problem, should be clearly defined.
- ✓ Basic assumptions or postulates (if any) relating to the research problem should be clearly defined.
- ✓ A straightforward statements 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 data available must also be considered by the researcher in defining the problem.
- ✓ The scope of the investigation or the limits within which the problem is to be studied must be mentioned explicitly in defining the research problem.

2.2.2 Evaluation of the Problem

Before the final decision is made on the investigation of the problem, the feasibility of the problem has to be tested with regard to personal suitability of the researcher and social value of the problem. In short, the research problem should be evaluated in terms of the following criteria.

Is the problem researchable?

Some problems cannot be effectively solved through the process of research. Particularly, research cannot provide answers to philosophical and ethical questions that do not show the relationship existing between two or more variable vividly. Therefore, the problem must be stated in workable research question that can be answered empirically.

Is the problem new?

As much as possible, the research problem needs to be new. One should not target his investigation to the problem that had already been thoroughly investigated by other researchers. To be safe from such duplication, the researcher has to go through the record of previous studies in a given field. However, there are times where by a problem that has been investigated in the past could be worthy of study. A researcher may repeat a study when he wants to verify its conclusion or to extend the validity of its findings in situation entirely different from the previous one.

Is the problem significant?

The question of significance of the problem usually relates to what a researcher hopes to accomplish in a particular study. What is his purpose in undertaking to solve the particular problem he has chosen? What new knowledge does he hopes to add to the sum total of what is known? And what value is this knowledge likely to have? When these all questions are answered clearly by the researcher, the problem should be considered for investigation.

The researcher should show that the study is likely to fill the gaps in the existing Knowledge to help resolve some of the inconsistencies in previous research or to help in the reinterpretation of the known facts. The findings should become a basis for theory generalization, or principles and should lead to new problems further research.

Is the problem feasible?

The feasibility of the research problem should also be examined from the point of view of the researcher's personal aspects such as:

- ✓ **Researcher Competence:** The problem should be in an area in which the researcher qualified and competent. Before indulging into investigation of the problem, the researcher has to make sure that he is well acquainted with the existing theories, concepts and laws related to the problem. He must also possess the necessary Skills and competence that may be needed to develop, administer, and interpret the necessary data gathering tools. What is more, he needs to consider whether he has the necessary knowledge of research design and statistical procedure that may be required to carry out the research through its completion.

- ✓ **Interest and enthusiasm:** The researcher has to make sure that the problem really interests him. He must also be truly enthusiastic about the problem. If the problem is chosen properly by observing these points, the research will not be boring; rather it will be love's labor.

- ✓ F**inancial consideration:** Research is an expensive endeavor, which requires a great deal of money to invest. In this regard, the researcher should ascertain whether he has necessary financial resources to carry on the investigation of the selected problem. An estimate of the expenditure involved in the data gathering equipment, printing, test material, travel, and clerical assistance to be specified. Furthermore, the possible sources of fund must be consulted ahead of time.

- ✓ **Time requirement:** Research should be undertaken within a given scope of time, which was allocated, with careful analysis of the prevailing situation. Each and every activity of a research process requires time. Particularly, it is worthwhile to plan for the time that will be needed for the development and administration of tools, processing and analysis of data, and writing of the research report. While allocating time for research project, care should be taken for the researcher's other engagement or commitments, the respondents' accessibility, the expiry data of the required data.

- ✓ **Administrative consideration:** The researcher has to pay to all administration matters that are necessary to bring his study to its full administrative matters that are necessary to bring his study to its full completion. In this regard the researcher should consider the kinds of data equipment, specialized personnel. And administrative facilities that are needed to complete the study successfully. The researcher must assure whether the pertinent data are available and accessible to him.

2.3 Problem Justification

Now that you have identified and defined the problem situation, it is necessary next to justify the importance of the problem. Research often is expensive and time consuming. Ask yourself a series of questions and then try to answer each of them:

- Is the problem you wish to study a current and timely one? Does the problem exist now?
- How widespread is the problem? Are many areas and many people affected by the problem?
- Does the problem affect special groups such as mothers or children?
- Does the problem relate to broad social, economic and demographic issues, such as unemployment, income mal-distribution, the status of women, education, and maternal and child health?
- Who else concerned about the problem?

Then, review your answers to these questions and arrange them into one or two paragraphs that justify the importance of research problem.

2.4 Sources of Research problem

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

- **Professional experience**: One of the sources of problem for beginner researcher is his own experience as a professional in a given field. The day-to-day observation of the incidences is the working place and out of the working environment, which includes the experience of his colleagues, their attitude, home environment, social-economic status and motivation level provide rich sources of the problem.
- **Inference from theory:** A research problem can be derived from a critical look into different theories. In other words application of some general principles involved in different theories to specific situation makes an important starting point of research.
- **Technological and social changes:** Technological and social change directly or indirectly exerts an influence in the function of an organization. All such change brings about new problems for research. For instance, change may affect policy issues in which case they may arouse interest in investigating new policies among the policy analysts or other concerned personalities.

The following points may be considered in selecting a research problem:

- A subject that is overdone should not be normally chosen, for it will be a difficult task to throw any new light to such a case.
- Governmental subjects should not become a choice of an average researcher.
- Too narrow or too vague problems should be avoided.
- The subject selected for research should be familiar and feasible so that the related research material or source of research is within one's reach.

- The importance of the subject, the qualification and the training of researcher, the cost, the time factor are the few points that must be considered in selecting a problem.

2.5 Topics to avoid

It is often only possible in retrospect to recognize the topic you should not even have attempted! However, here are a few hints that may help you to avoid the research disaster. The topics to avoid are those that are:

- **Too big**. For example, 'Human resource management – innovative international perspectives'. Some very large projects can be worthy and valuable to an organization, but you need to ask yourself whether you have the time, experience and resources to complete them. Winkler and McCuen (1985) also warn that the big topic is also the most difficult to write about: it is difficult knowing where to begin, and omissions and oversights are more crudely exposed.
- **Traced to a single source**. This may not be a particular problem in pure business research when a single solution is needed to a problem. However, if the research is linked to an academic program of study, or important for your own professional development, there will usually be a requirement that issues are explored from a variety of different angles.
- **Too trivial**. This may seem rather subjective, but you should use your common sense to evaluate the kinds of projects that are worth doing and those that are not. As a general rule of thumb try using the 'So what?' test. Ask yourself, after completing the research, whether the results have any meaning or significance (to others not just to yourself). For example, a research project that surveyed how to reduce the use of paper in a marketing department of ten people would yield very little of value. On the other hand, a project that took the issue of recycling (paper, printer cartridges, furniture, computers, etc.) across an organization could have considerable scope and link into the broader environmental debate.
- **Lacking in resource materials**. Look out for warning signs – very few references to the topic in the main textbooks, practitioner journals or other refereed journals or websites. If the project is going to rely on access to in-house knowledge experts, make sure (in advance) that they are both available and willing to cooperate with you.
- **Lacking in sponsorship**. This does not necessarily mean financial sponsorship, but it is often important to obtain the support and commitment of key people in the organization or fieldwork setting where the research is taking place. These are likely to be directors, senior managers, or the leaders of networks or groups.
- **Too technical**. Some projects are more concerned with solving highly technical problems rather than organizational research. Leave these to the technical gurus.
- **Intractabl**e. You may be offered a problem that nobody else has been able to solve. Be highly suspicious of this kind of gift! Ask yourself: 'Why me?' It may be an offer you need to refuse.
- **Dependent on the completion of another project**. Even if you are 'guaranteed' that projects you hope to use as data sources will be completed in time for your use, you are strongly advised not to make your own project dependent on them. If slippage occurs, your own research will be held up or even scrapped.

- **Unethical**. Avoid taking on projects that can damage other people physically, emotionally or intellectually. Refuse to take on a project that forces you to breach confidentiality or trust. When using interviews, observation or surveys, you will need to pay particular attention to politically sensitive issues such as power relationships, race, gender and the disclosure of personal information. Ethics are discussed in more detail at the end of this chapter and elsewhere in this book.

2.6 Hypothesis

Hypothesis form is employed when the state of the existing knowledge and theory permits formulation of reasonable prediction about the relationship among variables. The word hypothesis is a compound of two words, "hypo" and "thesis". Hypo means, under or below and thesis means a reasoned theory or rational viewpoint. Thus, hypothesis would mean a theory, which is not fully reasoned. Hypotheses are a set of suggested tentative solution of a research problem, which can be or may not be a real solution.
Research hypothesis differs from research question in that, hypothesis both indicate the question in testable form and predict the nature of the answer. Hypothesis proposes a relationship between two or more variables. In other words, hypothesis is a theory entertained in order to study the facts and examine the validity of the theory. The task of the researcher in this case will be to establish and test such hypothesis.

Establishing a hypothesis should follow rules like:

- The variables must be clearly specified and measurable by some techniques we know
- The relationship between them must be stated precisely.

2.7 Importance of Hypothesis

A well-grounded hypothesis provides the following advantages:

- Represents specific objective, which determine the nature of the data needed to test the proposition;
- Offer basis for selecting the sample, the research procedure, and the statistical analysis needed.
- Keeps the study restricted in scope thereby preventing it from becoming too broad;
- Sets a framework for reporting the conclusion of the study.

2.8 Criteria of Usable Hypotheses

Hypotheses can be useful if and only if they are carefully formulated. There are several criteria used to evaluate hypothesis. These include the following:

- Hypotheses should be clearly and precisely formulated
- Hypotheses should be formulated in such way that, they can be tested or verified (should be testable)
- Hypothesis should state explicitly the expected relationship between variables

- Hypotheses should be limited in scope. Hypotheses of global significance are not usable as they are not specific and simple for testing and drawing conclusions.
- Hypotheses should be consistent with the known facts. In other words hypotheses should be grounded in a well-established facts, theories or laws.

Hypotheses should be stated as much as possible in simple terms. The simple statement helps to gain the following advantages

- It becomes easily understandable to others (readers);
- It becomes easily testable;
- It provides a basis for a clear and easily comprehended report at the completion of the study;
- The hypotheses selected should be amendable to testing within a reasonable time.

Some examples of Hypothesis:

Hypothesis: 1

Political participation Increases With education

↓ ↓ ↓

Variable 1 (dependent variable) Relationship **Variable 2** (independent variable)

Hypothesis: 2

Alienation increase with poverty

↓ ↓ ↓

Variable one ***Relation*** ***Variable two***

The result of the hypothesis test is the substance of our conclusion and expressed as generalization.

A hypothesis is a prediction of a relationship between one or more variables and the problem under study. That is, it specifies the relationship among variables. These variables are to be statistically tested at a later stage. In order to measure the relationship among variables to be studied the dependent and independent variables need to be identified. A few examples are given below:

1. The health of children living in rural villegization projects is better than those living in traditional rural communities.
2. To examine whether there is any significant difference between district "A" and district "B" with respect to their malaria prevalence rates

Research Objectives

Research Objectives is a statement that clearly depicts the goal to be achieved. It summarizes what is to be achieved by the study.

Why should research objectives be developed?

The formulation of research objectives will help you to:

- Focus the study;
- Avoid the collection of data which are not strictly necessary for understanding and solving the problem you have identified;
- Organize the study in clearly defined parts.
- The explicit formulation of study objectives is an essential step in the planning of a study. It is said that "a question well-stated is a question half-answered", but a question that is poorly stated or unstated is unlikely to be answered at all.

How should we state our objectives?

We have to make sure that our objectives:

- Cover the different aspects of the problem and its contributing factors in a **coherent way** and in a **logical sequence;**
- Are **clearly expressed** in measurable terms;
- Are **realistic** considering local conditions;
- Meet the purpose of the study;

Objectives should be stated by using **action verbs** that are specific enough to be measured.

Examples of **action verbs** are:

- to determine
- to compare
- to verify
- to calculate
- to describe
- to find out
- to establish

Avoid the use of vague non-action verbs such as:

- to appreciate
- to understand
- to study
- to believe

Research objectives can be stated as:

- **Questions**- the objectives of this study are to answer the following questions ….
- **Positive sentence** - the objectives of this study are to find out, to establish, to determine, …

- **Hypothesis** - the objective of this study is to verify….

Based on the type of the study problem, it might be possible to develop explanations for the problem that can be tested. If so, we can formulate hypotheses in addition to the other study objectives.

Research objectives are:

- General objectives
- Specific objectives

The General objective

- It provides a short statement of the scientific goal being pursued by the research.
- It is ultimate goal which is achieved in the research out come
- It is not detailed

The Specific objective

- Are operational in nature
- a means so as to achieve the general objective activities in detail

Research question

- Some research objective need research question or research hypotheses.
  - ✓ Research question – to be answered
  - ✓ Research hypotheses- to be proved or disproved

Research question simply means putting research objectives in question form. The clearer the question, the more convincing the research project will be.

CHAPTER THREE

APPRAISAL OF RELATED LITERATURE

3.1 What is a Literature Review?

The phrase 'review of literature' consists of two words: Review and Literature. In research methodology the term literature refers to the knowledge of a particular area of investigation of any discipline which includes theoretical, practical and its research studies.

The term 'review' means to organize the knowledge of the specific area of research to evolve an edifice of knowledge to show that his study would be an addition to this field.

A literature review is a description of the literature relevant to a particular field or topic. It gives an overview of:

- What has been said,
- Who the key writers are,
- What are the prevailing theories and hypotheses,
- What questions are being asked, and
- What methods and methodologies are appropriate and useful. As such, it is not in itself primary research, but rather it reports on other findings.

A literature review is much more than an annotated bibliography or a list of separate reviews of articles and books. It is a critical, analytical summary and synthesis of the current knowledge of a topic. Thus, it should compare and relate different theories, findings, etc, rather than just summarize them individually. In addition, it should have a particular focus or theme to organize the review. It does not have to be an exhaustive account of everything published on the topic, but it should discuss all the significant academic literature important for that focus.

Reviewing the literature has two phases.

- The first phase includes **identifying** all the relevant published material in the problem area and **reading** that part of it with which we are not thoroughly familiar. We develop the foundation of ideas and results on which our own study will be built.
- The second phase of the review of literature involves **writing** this foundation of ideas into a section of the research report. This section is for the joint benefit of the researchers and readers. For the researcher, it establishes the background in the field. For the readers it provides a summary of the thinking and research necessary for them to understand the study.

Literature reviews are usually organized thematically, such as different theoretical approaches, methodologies, or specific issues or concepts involved in the topic. A thematic organization makes it much easier to examine contrasting perspectives, theoretical approaches, methodologies, findings, etc, and to analyze the strengths and weaknesses of, and point out any gaps in, previous research. And this is the heart of what a literature review is about.

A literature review may offer new interpretations, theoretical approaches, or other ideas; if it is part of a research proposal or report it should demonstrate the relationship of the proposed or reported research to others' work; but whatever else it does, it must provide a critical overview of the current state of research efforts. Literature reviews are common and very important in the sciences and social sciences.

Usually one of the first steps in the research process is a review of the literature on and around the subject of enquiry. Its main functions are to avoid duplications, discover gaps in research and place our own approach among the work and approaches of other scholars, help to know how deep and comprehensive the area to be investigated.

Let us consider the role of a literature review, the best -known yet least understood method of starting a project. Reviewing the secondary literature on a given topic is common to all dissertations and theses, whether in social sciences or humanities. The first thing to note is that reviewing the literature is not a compartmentalized stage of research. Instead, the researcher constantly reviews the literature until the day the project is submitted.

3.2 Advantages of literature review

- focus and clarify our research problem
- To avoid duplications: it ensures that we are not reinventing the wheel. It helps us to put our own work, not to make the same wooden wheel what have others already done.
- To give credit for those who have laid the foundation for the field of study.
- Assist in identifying ‘gaps’ in research: areas/issues which are not touched by other scholars in the related field of study.
- expose to and enable to demonstrate the knowledge of the area that we are doing research in: to show the extent of ability to do research and contextualize the project within a wide-range of existing knowledge base; helps to give credit for us and not to conduct a research in the area we do not know.
- To define the boundaries of our field of research: there should be a manageable scope of the research otherwise it becomes difficult.
- Assisting in the choice of the approaches, methods, procedures and instruments to be used: by reading literature we can have alternative procedures and instruments among the work or

approaches of others; in selecting these methods we have to evaluate them and select the suitable ones for our research work.

- highlight the key debates, terms and concepts employed your topic area
- To learn from the successes and failures of others: to become smarter than a person before, pick up the success, identify failures and the causes. In relation to this, there is an important saying explained as "a wise man learns from the failures of others, whereas, a foolish man learns from his own failures."

3.3 Objectives of Review of Literature

The review of literature serves the following purposes in conducting research work:

1. It provides theories, ideas, explanations or hypothesis which may prove useful in the formulation of a new problem.
2. It indicates whether the evidence already available solves the problem adequately without requiring further investigation. It avoids the replication.
3. It provides the sources for hypothesis. The researcher can formulate research hypothesis on the basis of available studies.
4. It suggests method, procedure, sources of data and statistical techniques appropriate to the solution of the problem.
5. It locates comparative data and findings useful in the interpretation and discussion of results. The conclusions drawn in the related studies may be significantly compared and may be used as the subject for the findings of the study.
6. It helps in developing experts and general scholarship of the investigator in the area investigated.
7. It contributes towards the accurate knowledge of the evidence or literature in one's area of activity is a good avenue towards making oneself. This knowledge is an asset ever afterwards, whether one is employed in an institution of higher learning or a research organization.

Bruce W. Tuckman (1978) has enumerated the following purposes of the review:

1. Discovering important variable.
2. Distinguishing what has been done from what needs to be done.
3. Synthesizing the available studies to have perspective.
4. Determining meanings, relevance of the study and relationship with the study and its deviation from the available studies.

Edward L. Vockell (1983) has pointed out the following two purposes:

- The main purpose of this review is to put the hypothesis to be examined in the research report into its proper context.

- Secondary purposes of this part of the report are to provide readers with guidelines regarding where they can look to find more information and to establish the author's credential by letting readers know that the researcher is aware of what has been going on with regard to the current and related topics.

The review of literature provides some insight regarding strong points and limitations of the previous studies. It enables him to improve his own investigation.

3.4 How to organize a literature review

There are a number of ways of organizing a literature review. Here is one suggestion:

a. **Introduction**: define the topic, together with your reason for selecting the topic. You could also point out overall trends, gaps, particular themes that emerge, etc.
b. **Body**: this is where you discuss your sources. Here are some ways in which you could organize your discussion:
   - **Chronologically**: for example, if writers' views have tended to change over time. There is little point in doing the review by order of publication unless this shows a clear trend;
   - **Thematically**: take particular themes in the literature;
   - **Methodologically**: here, the focus is on the methods of the researcher, for example, qualitative versus quantitative approaches.
c. **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.

3.5 Processes in reviewing literature

- **Identifying the relevant literature**: in identifying the relevant literature find/compile the key words of the topic or the problem. For example, in the topic "academic achievement of introvert girls" the key words could be academic achievement, introvert and girls.
- **Read the literature**: the following steps can help you to decide what to read.
  - ✓ Check for the preliminary sources such as indices, dissertations, abstracts, encyclopedia, articles, journals, books, etc.
  - ✓ Prepare a bibliography of primary and secondary sources
  - ✓ Read the sources by taking paraphrased notes – writing notes on your own words
  - ✓ Avoid the use of many quotations and plagiarisms
  - ✓ Select the grain from the chaff/joke/make fun
- **Analyzing and interpreting the notes from different literatures**

3.6 Conceptual Framework and the Literature Review

A conceptual framework is an organizational device to structure the research work. Many thesis writers do not bother about conceptual framework. They put it in the background or elsewhere, but before literature review we do have conceptual framework. A conceptual definition is an element of the scientific research process, in which a specific concept is defined as a measurable occurrence. Examples of ideas that are often conceptually defined include intelligence, knowledge, tolerance, and preference.

3.6.1 Components of Conceptual Framework

1. Identification of variables: The most basic operational definition is a process for identification of an object by distinguishing it from its background of empirical experience. To identify the variables we have to make a thorough literature review. To study the factors determine the distribution of vegetation, variables such as rainfall, temperature, relief, soil, etc, should be identified.

2. Operationalize variables: in doing research we don't use dictionary definitions for variables identified; instead, we should write operational definitions. Operational definition is a showing of something — such as a variable, term, or object — in terms of the specific process or set of validation tests used to determine its presence and quantity. Properties described in this manner must be publicly accessible so that persons other than the definer can independently measure or test for them at will. An operational definition is generally designed to model a conceptual definition. Following the establishment of a conceptual definition, the researcher must use an operational definition to indicate how the abstract concept will be measured.

We have two types of definitions: Conceptual and operational definitions. A concept is a mental image that summarizes a set of similar feelings or ideas. For example, we experience a bundle of feelings and call it love. We see that some people have little to live on and call it poverty. Since no concept has any ultimate or real meaning, each of us give different shades of meanings to the concepts we use. So, conceptual definition is a process of specifying what we mean by terms like poverty, social status, prejudice, alienation etc. Conceptual definition is synonymous with dictionary definition.

One variable may have one or more operational definitions. For instance, drought is defined as the failure of the normal rainfall although it has different definitions. For example, we can have drought in Gambella and in Northern Ethiopia normally depending on the ecological systems. Therefore, if the normal rainfall in Gambella is 1500mm and 1000mm in northern Ethiopia, studied by different researchers, they should give different operational definitions for the term drought. Giving operational definitions for variables are very important:

- ✓ To determine the relevance of data to be collected for analysis and interpretation
- ✓ For comparison of studies on one variable in different places and times

- ✓ could be serving as a lead for further studies
- ✓ In having undisputed practical applications, especially social and medical sciences, where operational definitions of key terms are used to preserve the unambiguous empirical testability of hypothesis and theory.

3. Certain Assumptions: assumption is one component of conceptual framework for two reasons:

- To simplify the complexity of the real world
- To observe deviations from the theoretical issue.

Walter Christaller's central place theory is the theoretical work on the size and distribution of urban centers. It was formulated to observe the theoretical distribution of urban centers by size categories. He comes out with hexagonal latrix. The smaller centers are found at the corner of the hexagon, but it is not really true. His major assumptions are: the geographic areas are isotropic in nature, uniform distribution of population, uniform purchasing power of the people, etc. Hence, the use of Walter Christaller's theory is used to see how reality deviates from the theoretical.

4. The relationship between variables: The variables are identified and operationally defined. First we have to have relationship between variables in our mind then go to field to collect the necessary data. To observe relationships between variables we have to read more literature. Concept map is an important representation of the relationship between variables. That is, representing the relationship between variables using graphs, charts and diagrams. It is the diagrammatic representation of realities. In concept map either we can develop our own model or can adopt the models of others to manage the entire research work. It is done at the proposal stage.

Conceptual framework: It is the anticipated cause and effect relationship between conceptual variables. Conceptual framework deals with the inter relationship between key variables or issues to be studied. It can be changed or modified.

3.6 Problems of Literature Review

- **Lack of organization or structure**: literature has to have a format and organization. Don't quote it as you wish.
- **Lack of focus and coherent**: do not diffuse issues; rather try to focus on major problems.
- **Is being repetitive and verbose**: don't use many words unnecessary; sometimes it is a tendency to hide weaknesses.
- **Failing to cite influential papers**: missing to cite those papers that contribute much in field. In studying population issues in Ethiopia, failing to cite Professor Mesfin W/mariam is a serious mistake committed by the researchers, the one who studies about relativity should cite Albert Einstein.

- **Failing to keep up recent documents**: citing old literatures that their theories and principles are outdated. In reading literature, try to use recent documents and references.
- **Failing to critically evaluate cited papers**: is not annotating, failing to explain, interpret and comment on the literatures
- **Citing irrelevant or trivial references**: citing literatures of little value rather than those have major contribution to the problem. Example, Newspapers, magazines etc.
- **Depending too much on secondary sources**: usually a tendency of citing a citation of citation. We usually cite somebody as cited in some body. But it is not totally prohibited; do not use over and over again.

3.7 Sources of Review of Literature

There are various sources of literature which may be used for this purpose. These sources can be broadly classified into:

- Card catalogues of books in libraries
- Organizations (institutions)
- Published information (books, journals, etc.)
- Unpublished documents (studies in related fields, reports, etc.)
- Computer based literature searches such as Medline
- Opinions, beliefs of key persons

Some examples of resources where information could be obtained are:

- Clinic and hospital based data from routine activity statistics
- Local surveys, annual reports
- Scientific conferences
- Statistics issued at region and district levels
- Articles from national and international journals (e.g., The Ethiopian Journal of Health Development, The Ethiopian Medical Journal, The East African Medical journal, TheLancet, etc.)
- Internet
- Documentation, reports, and raw data from the Ministry of Health, Central Statistical Offices, Nongovernmental organizations, etc.

CHAPTER FOUR

RESEARCH DESIGN (PLANNING THE RESEARCH PROJECT)

4.1. Meaning of Research Design

A researcher after identifying, defining and properly formulating a research problem the next step is he/she has to prepare a research design or plan of the research work.

A research design is something like a **blue print**. It outlines the approach to be used to collect the data. It describes the conditions under which the data will be collected; how the subject or respondents will be selected; what instruments will be used; and generally provides information about the who, what, when, where and how of the research project.

Research design is a plan of collecting and analyzing data in an economic, efficient and relevant manner. It is a plan of organizing framework for doing the study and collecting the necessary data. In other words research design is nothing but the conceptual structure with in which research is conducted. It constitutes the blue print for collection, measuring and analysis of data.

> The research design is the investigator's plan of action for answering the research question (s). The objective in selecting a study design is to minimize possible errors by maximizing the reliability and validity of the data.

Whatever is the nature of the research design the following general rules should be followed in planning and preparing a research design:

- Define the nature and scope of the problem
- Specify the related variables (specify the sources and types of information needed)
- Exclude the variable not relevant to the study
- Start with the logical hypothesis.

Generally, the research design includes an outline of what the researcher will do from formulating the hypothesis and its operational implication to the final analysis of data. Specifically, the research design highlights decisions which include:

- the nature of the study
- the purpose of the study
- the location where the study would be conducted
- the nature of data required

- from where the required data can be collected
- what time period the study would cover
- the type of sample design that would be used
- the techniques of data collection that would be used
- the methods of data analysis that would be used
- the manner in which the report would be prepared

4.2 Need for Research Design

Why we need to have a research design? Research design is necessary because:

- It facilitates the smooth sailing of the research operation
- It makes research project as efficient as possible and help to yield maximum information with minimum expenditure, time and effort.
- It helps the researcher to organize his ideas in a form whereby it will be possible for him to look for flaws and inadequacies
- Design will be given to others for their comment and critical evaluation. In absence of such course of action, it will be difficult for the critics to provide comprehensive review of the proposed study.

4.3 Features of Research Design

Important features of a good research design can be summarized as follow:

- It is a plan that contain a clear statement of the research problem and specifies the source and types of information relevant to the research problem;
- It is a strategy specifying which approach will be used for gathering the data or the relevant information;
- It indicates the population to be studied and methods to be used in processing and analyzing the data;
- It also tentatively includes the time and cost budgets, since most studies are done under these two constraints.

4.4 Important concepts relevant to research design

Variable: A variable is measurable characteristic of a person, object or phenomenon, which can take on different values. A simple example of a variable is “a person’s age”. The variable "age" is measurable and can take on different values since a person can be 20 years old, 35 years old and so on. Other examples of numerical variables are:

- weight (expressed in kilograms or in pounds);
- distance between homes and clinic (expressed in kilometers or in minutes walking distance); and

- monthly income (expressed in birr, dollars)

The different values of a variable may also be expressed in categories. For example, the variable sex has two values male and female which are distinct categories. Other examples of categorical variables are:

Variables	Categories
Color	red blue green, etc.
Outcome of disease	recovery chronic illness death
Main type of staple food eaten	maize millet rice cassava, etc

Dependent variable: If one variable depends upon or a consequence of the other variable is called a dependent variable. Is a variable that is to be predicted or explained?

Independent variable: is a variable that is expected to influence the dependent variable.

Extraneous variable: Independent variables that are not related to the purpose of a study, but may affect the dependent variable are termed as extraneous variable.
E.g., if someone wants to test the relationship between intensity of light on the level of productivity, other variables like age of workers, heat in the working place or personal problem of worker may as well affect the level of productivity. Since they are not related to the purpose of a study, they are called extraneous variable.

Control: A good research design has to minimize the influences of extraneous variable. To do so the researcher uses control as a remedy to minimize the effects of extraneous variable. In experimental research control refers to restrain to experimental condition.

Confounded relationship: When dependent variable is not free from the influence of extraneous variable, then the relationship between dependent and independent variables is said to be confounded an extraneous variable.

Experimental and control groups: In experimental research when a group is exposed to usual condition is called control group, but when a group is exposed to special condition is an experimental group.

Treatments: The different condition under which experimental and controlled groups are put are referred to us treatment. The usual study program and the special study program are an example of two treatments in studying the effects new or special study program on performance of students.

Experiment: The process of examining the truth of a statistical hypothesis, relating to some problem, is known us an experiment. E.g., examining the usefulness of a newly developed drug is an example of an experiment. Experiment can be comparative or absolute experiment. If we want to determine the impact of newly developed drug against the existing drug is an example of comparative experiment. But the previous example is an example of absolute experiment.

Experimental unit: the pre-determined plots (or blocks or group) where different treatments are used are known as experimental units.

4.5 Types of Research Design/Study Design

A study design is the process that guides researchers on how to collect, analyze and interpret observations. It is a logical model that guides the investigator in the various stages of the research. Several classifications of study types are possible, depending on what research strategies are used.

Non-intervention (Observational) studies in which the researcher just observes and analyses researchable objects or situations but does not intervene; and

Intervention studies in which the researcher manipulates objects or situations and measures the outcome of his manipulations (e.g., by implementing intensive health education and measuring the improvement in immunization rates).

Study designs could be:

- Exploratory Research Design,
- Descriptive Research Design and
- Analytical Research Design

A) Exploratory Research Design/Study:

Exploratory research design is known as ***formulative research design***. It is aimed at identifying and formulating a research problem or developing working hypothesis. The main objective of such study is only formulating a problem for further, precise investigation or of developing the working hypothesis from an operational point of view.

The major concentration in such study is on the discovery of ideas and insights. An exploratory study is often used as introductory phase of a large study and results are used in developing specific technique for the larger study. The design for such study is characterized by a great deal of flexibility.

Since no clear hypothesis has been developed about the problem, the following forms of research design can be used.

The survey of related literature: This is the most simple and fruitful method of formulating precisely the research problem or developing hypothesis. Hypothesis stated by earlier works may be reviewed and their usefulness be evaluated as a basis for further research.

Experience Survey: This implies the survey of people who have practical experience with the problem to be studied. The objective of such survey is to obtain insight into the relationship between variables and new ideas relating to the problem. For such purpose people who are competent and can contribute new ideas are carefully selected as respondent and the investigator then interview them.
The researcher must prepare an interview schedule, which ensures flexibility in a sense that the respondent should be allowed to raise issues and questions, which the researcher has not previously considered. It is advisable to send a copy of interview schedule to be discussed to the respondent well in advance.

Analysis of insight (Examining analogous situation): is also important method for suggesting hypothesis for research.

It is particularly suitable in areas where there is a little experience to serve as a guide. This method consists of intensive study of selected instances of the phenomenon. For that purpose the existing records may be examined (if any). The unstructured interview may be conducted. The question however is that what type of examples (instances should be selected and studied?

The instances commonly chosen in social science are like

- Cases that provide sharp contrasts or
- Cases having striking features are considered to be relatively more useful to identify problems

Example

- Reaction of stranger
- The reaction of marginalized people
- The study of individuals who are in transition
- The reaction of people from different social strata

B) Descriptive Research Design:

Descriptive research design are those studies, which are concerned with describing the characteristics or function of a particular individual, or of a group or a phenomenon. Most of social researches come under this category.

This study involves the description of the extent of the association between two or more variables. Although association can be used only to infer but not to establish a causal relationship, they are often useful for predictive purpose.

Descriptive research in contrast to exploratory research is marked by the prior formulation of specific research problem (question). Investigator already knows a substantial amount about the research problem, may be as a result of exploratory study, before the project is initiated. Thus, the researcher should be able to define clearly, what he wants to measure and setup appropriate and specific means for measuring it.

In descriptive research the researcher needs to define not only what he wanted to measure but also must find adequate method for measuring it along with a clear-cut definition of population he wants to study. Since the purpose is to obtain complete and adequate information, the procedure to be used must be carefully planned. Thus the design in such study must be rigid and must focus on the following:

- Formulating the objective of the study
- Design the method of data collection
- Select the sample of the study (sampling)
- Collect the data relevant for the study
- Processing and analysis of the data collected
- Reporting the findings

Formulating the objective of the study (what is the study is about? why is it being made?):

The first step in descriptive study is to specify the objective with sufficient precision to ensure that the data collected are relevant.

Design the method of data collection:

After formulating the objective of the study next comes planning the method of data collection. First of all the researcher has to determine the relevant and type of data needed to the study. After defining the relevant information needed for the designed study, method of data and technique for collecting them must be devised. Method of data gathering (like, observation, questionnaires, and etc) with their merit and limitation are considered and the best one is selected for the particular study.

Select the sample of the study (sampling):

In most, if not all, studies the researcher takes out sample(s) and then wishes to make statements about the population on the basis of the sample analysis. In short sampling has to be designed. There are different sample techniques among which the appropriate sampling technique would be selected. The

sample expected to be representative and yielding accurate information with a minimum amount research effort.

Collect the data relevant for the study (Plan of data collection):

To obtain data free from errors introduced by those responsible for collecting them, it is necessary to supervise closely the staff or field workers as they collect and record information. As data are collected, they should be examined for completeness, comprehensibility, consistency and reliability.

Processing and analysis of the data collected:

The data collected must be processed and analyzed. Data processing design includes steps like coding the interview replies, observation, tabulating the data; and performing several statistical computations. To the extent possible, the processing and analyzing procedure should be planned in detail before actual work started.

Reporting the findings:

Finally, last of all comes the question of reporting findings. This is the task of communicating the findings to others and the researcher needs to be well planned so that all things relating the research study may be well presented in simple and effective style.

Such design appropriately referred to as a survey design since it takes into account all the steps involved in a survey research.

C) Analytic Studies

Analytic studies may be defined as studies **used *to test hypotheses*** concerning the relationship between a suspected risk factor and an *outcome* and to measure the magnitude of the association and its *statistical significance.* Analytic study designs can be divided into two broad design strategies:

- Observational and
- Intervention.

Observational Studies

No human intervention involved in assigning study groups; simply observe the relationship between exposure and disease. Examples of observational studies: comparative cross-sectional, cohort and case-control studies.

a) Comparative cross-sectional studies: Depending on the purpose of a given study, a cross-sectional survey could have an analytical component.

b) Cohort studies: Study groups identified by exposure status prior to ascertainment of their disease status and both exposed and unexposed groups followed in identical manner until they develop the disease under study, they die, the study ends, or they are lost to follow-up.

Strengths and Limitations of the Cohort Study Design

Strengths:

- Is of particular value when the exposure is rare
- Can examine multiple effects of a single exposure
- Allows direct measurement of incidence of disease in the exposed and non-exposed groups.

Limitations:

- Is inefficient for the evaluation of rare diseases
- Expensive and time consuming
- Validity of the results can be seriously affected by losses to follow-up.

c) Case-control studies: Group of subjects with the disease (cases) and group of subjects without the disease (controls) are identified. Information, about previous exposures is obtained for cases and controls, and frequency of exposure compared for the two groups.

Strengths and Limitations of the Case-Control Study Design

Strengths:

- Is relatively quick and inexpensive
- Is optimal for the evaluation of rare diseases.
- Can examine multiple etiologic factors for a single disease.

Limitations:

- Is inefficient for the evaluation of rare exposures
- Cannot directly compute incidence rates of disease in exposed and non- exposed individuals.
- Is particularly prone to bias compared with other analytic designs, in particular, selection and recall bias.

Intervention Studies

In intervention studies, the researcher manipulates a situation and measures the effects of this manipulation. Usually (but not always) two groups are compared, one group in which the intervention takes place (e.g. treatment with a certain drug) and another group that remains 'untouched' (e.g. treatment with a placebo).

The two categories of intervention studies are:

- Experimental studies and
- Quasi-experimental studies

1. Experimental Studies

An experimental design is a study design that gives the most reliable proof for causation. In an experimental study, individuals are randomly allocated to at least two groups. One group is subject to an intervention, or experiment, while the other group(s) is not. The outcome of the intervention (effect of the intervention on the dependent variable/problem) is obtained by comparing the two groups. A number of experimental study designs have been developed. These are widely used in laboratory settings and in clinical settings. For ethical reasons, the opportunities for experiments involving human subjects are restricted. However, randomized control trials of new drugs are common.

At community level, where health research is frequently undertaken, we experience not only ethical but also practical problems in carrying out experimental studies. In real life settings, it is often impossible to assign persons at random to two groups, or to maintain a control group. Therefore, experimental research designs may have to be replaced by quasi-experimental designs.

2. Quasi-experimental studies

In a quasi-experimental study, one characteristic of a true experiment is missing, either randomization or the use of a separate control group. A quasi-experimental study, however, always includes the manipulation of an independent variable which is the intervention. One of the most common quasi-experimental designs uses two (or more) groups, one of which serves as a control group in which no intervention takes place. Both groups are observed before as well as after the intervention, to test if the intervention has made any difference. (This quasi-experimental design is called the 'non-equivalent control group design' because the subjects in the two groups (study and control groups) have not been randomly assigned.)

Characteristics of a Good Research Design

A good research design is often possesses the qualities such as being flexible, suitable, efficient, economical and so on. Generally, a research design which minimizes bias and maximizes the reliability of the data collected and analyzed is considered a good design.

A research design which involves the smallest experimental error is said to be the best design for investigation. Further, a research design that yields maximum information and provides an opportunity of viewing the various dimensions of research problem is considered to be the most appropriate and efficient design. Thus, the question of good design relates to the purpose or objective and nature of the research problem studied. While a research design may be good, it may not be equally suitable to all

studies. In other words, it may be lacking in one aspect or the other in the case of some research problems. Therefore, no single research design can be applied to all types of research problems.

A research design suitable for a specific research problem would usually involve the following considerations:

- The methods of gathering the information
- The skills and availability of the researcher and his/her staff, if any
- The objectives of the research problem being studied
- The nature of the research problem being studied and
- The available monetary fund and time duration for the research work

CHAPTER FIVE

A GUIDE TO PREPARE RESEARCH PROPOSAL

5.1 What is a Research Proposal?

After proper and complete planning of a research, the plan should be written down. The research proposal is the detailed plan of study. The term "research proposal" indicates that a specific course of action will be followed. It is a document which sets out your ideas in an easily accessible way. The intent of the written research proposal is to present a focused and scholarly presentation of a research problem and plan. The objective in writing a proposal is:

- to describe what you will do,
- why it should be done,
- How you will do it and what you expect will result.

Being clear about these things from the beginning will help you complete your research in a timely fashion. A vague, weak or fuzzy proposal can lead to a long, painful, and often unsuccessful research writing exercise. A clean, well thought-out proposal forms the backbone for the research itself. A good research proposal hinges on a good idea. Getting a good idea hinges on familiarity with the topic. This assumes a longer preparatory period of reading, observation, discussion, and incubation. Read everything that you can in your area of interest. Figure out what are the important and missing parts of our understanding. Figure out how to build/discover those pieces. Live and breathe the topic. Talk about it with anyone who is interested. Then just write the important parts as the proposal. The written proposal:

- forces the students to clarify their thoughts and to think about all aspects of the study;
- is a necessary guide if a team is working on the research;
- Is essential if the study involves research on human subjects or on experimental animals, in order to get the institution’s ethical approval; is an essential component submitted for funding.

From the process of the development of the research proposal, students benefit from the advice of their supervisor(s), experts and colleagues in referring to their plan. But once a proposal for a study has been developed and approved, and the study has started and progressed, it should be adhered to strictly and should not be changed. Violations of the proposal can discredit the whole study.

A well-thought out and well-written proposal can be judged according to three main criteria:

- Is it adequate to answer the research question(s), and achieve the study objective?
- Is it feasible in the particular set-up for the study?
- Does it provide enough detail that can allow another investigator to do the study and arrive at comparable results?

The main questions that you are going to answer when writing your research proposal are:

- Is my proposed research interesting, important and relevant?
- Who has already done research in this area?
- What are my aims, objectives, research questions or hypotheses?
- How do I intend to conduct the research?
- Where do I intend to do the Research?
- What is my timetable for conducting the research?
- What do I expect the outcome of the research to be?

5.2 Function of the research proposal

Research proposal may function at least in three ways, namely:

- as a means of communication,
- as a plan and
- as a contract

Proposal as a means of communication serves to communicate the investigator's research plan to those who-give consultations and / or disburse fund. Proposal is the primary source on which the graduate students' **thesis or dissertation** committee must base the function of: review, consultation and more importantly, approval for implementation of the research project. In general**,** the quality of assistance and the probability of financial support will all depend directly on the clarity and justification of the proposal.

Research proposal as plan helps the researcher to organize his idea in a systematic manner and to look for strengths and flaws. A successful proposal sets out the plan in step-by-step detail. That is, it provides an inventory of what must be done and which materials have to be collected as a preliminary step. Generally, the acceptability of results is judged exclusively in terms of the adequacy of the methods employed in recording, analyzing and interpreting the data in the planned study.

Proposal also functions as a contract. A completed proposal approved for execution and signed by all members of the sponsoring committee, constitute a bond of agreement between the researcher and that committee. An approved grant proposal results in a contract between the investigator (and often the university) and funding sources.

Proposal for thesis and dissertation should be in final form prior to the collection of data. Once document is approved in final form, neither the student nor the sponsoring faculty members should be free to alter the fundamental terms of the contract by unilateral decision.

Importance of the research proposal

The research proposal has the following importance.

- It serves as a basis for determining the feasibility of the research project.
- It provides a systematic plan of procedure for the researcher to follow.
- It gives the research supervisor a basis for guiding the researcher while conducting the study.
- It reduces the probability of costly mistake.
- Preparation of a full-fledged proposal is not a one-time endeavor. But, is the result of continuous modification and amendment through discussion with experts in the field.

5.3 Components of a Research Proposal

The basic components of a research proposal are the same in many fields. However, how they are phrased and staged may vary by discipline. The following components can be regarded as steps in the writing of the research proposal. They are important and should be followed for the actual composition of the proposal. The organization of the contents of a proposal may vary somewhat with the nature of the activity proposed. Generally, the basic components of a proposal are described in this unit in the order in which they most logically appear in a proposal. However, when it comes to related research, the inquirer may find it useful, even necessary, to incorporate some parts of the discussion into other sections of the proposal.

Components of a research proposal:

1) Title page
2) Summary/Abstract
3) Introduction/Background
4) Statement of the problem
5) Literature review
6) Hypotheses/Questions
7) Conceptual framework
8) Objective/Aim of the study
9) Research methods, materials and procedures
    a. Study area
    b. Study design
    c. Study subjects
    d. Eligibility Criteria (if any)
    e. Sample size

f. Sampling methods
g. Method of data collection
h. Description of variables
i. Data quality assurance
j. Operational definitions
k. Plan of data analysis

10) Work plan
11) Budget
12) References
13) Appendices/Annexes

Each of them can have their own separate section in research proposal. Some can be merged some on the other hand can be split into separate section or into further subsections.

Title page

A title ought to be well studied, and to give, so far as its limits permit, a definite and concise indication of what is to come. The title of your 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.

All words in the title should be chosen with great care, and association with one another must be carefully managed. The title page identifies the proposal and provides the endorsement of appropriate body (advisor). A good title is defined as the fewest possible words that adequately describe the contents of the study. Title is a label: it is not a sentence. Titles should almost never contain abbreviations. The title page has no page number and it is not counted in any page numbering.

Summary/Abstract

The abstract is a one page brief summary of the research proposal. It needs to show a reasonably informed reader why a particular topic is important to address and how you will do it. To that end, it needs to show how your work fits into what is already known about the topic and what new contribution your work will make. 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 information in the abstract that is not in the main text of your research proposal. Do not put references, figures, or tables in the abstract.

Introduction/Background

The introduction is the part of the proposal that provides readers with the background information for the research proposal. Its purpose is to establish a framework for the research, so that readers can

understand how it is related to other research. Be sure to include a hook at the beginning of the introduction. This is a statement of something sufficiently interesting to motivate your reader to read the rest of the proposal, it is an important/interesting scientific problem that your study either solves or addresses. The introduction should cite those who had the idea or ideas first, and should also cite those who have done the most recent and relevant work. You should then go on to explain why more work is necessary (your work, of course.)

The introduction also should address the following points:

- Sufficient background information to allow the reader to understand the context and significance of the question yare trying to address.
- Proper acknowledgement on the previous work on which you are building.
- Sufficient references such that a reader could, by going to the library, achieve a sophisticated understanding of the context and significance of the question.
- The introduction should be focused on the research question(s)
- all cited work should be directly relevant to the goal of the research
- explain the scope of your work, what will and will not be included

Statement of the Problem

Most research proposal may be considered as a response to a problem. A problem might be defined as the issue that exists in the literature, theory, or practice that leads to a need for the study. The prospective researcher should think on what caused the need to do the research (problem identification). The question that he/she should ask him/herself is: Are there questions about this problem to which answers have not been found up to the present? The research problem should be stated in such a way that it would lead to analytical thinking on the part of the researcher with the aim of possibly concluding solutions to the stated problem.

The problem statement describes the context for the study and it also identifies the general analysis approach. It is important in a proposal that the problem stand out—that the reader can easily recognize it. Effective problem statements answer the question *"**Why does this research need to be conducted**."* If a researcher is unable to answer this question clearly and succinctly, and without resorting to hyper-speak, then the statement of the problem will come off as ambiguous and diffuse. The most frequent dilemma among students is their seemingly aimless search for a problem significant enough to pursue and discrete enough to handle. A well-articulated statement of the problem establishes the foundation for everything to follow in the proposal and will render less problematic most of the conceptual, rhetorical and methodological obstacles typically encountered during the process of proposal development. This means that, in subsequent sections of the proposal, there should be no surprises, such as categories, questions, variables or data sources that come out of nowhere: if it can't be found in the problem statement section, at least at the implicit level, then it either does not belong in the study or the problem statement needs to be re-written.

Objective/aim of the study

The objectives of a research delineate the ends or aim which the inquirer seeks to bring about as a result of completing the research undertaken. An objective may be thought of as either a solution to a problem or a step along the way toward achieving a solution; an end state to be achieved in relation to the problem. The objectives of a research project summarize what is to be achieved by the study. Objectives should be closely related to the statement of the problem. After statement of the primary objective, secondary objectives may be mentioned.

Objectives should be

- simple (not complex),
- specific (not vague),
- stated in advance (not after the research is done), and
- Stated using "action verbs" that are specific enough to be measured.

Commonly, research objectives are classified into **general objectives and specific objectives.** The general and specific objectives are logically connected to each other and the specific objectives are commonly considered as smaller portions of the general objectives. It is important to ascertain that the general objective is closely related to the statement of the problem.

General objective

- What exactly will be studied?
- General statements specifying the desired outcomes of the proposed project

Specific objectives

- Specific statements summarizing the proposed activities and including description of the outcomes and their assessment in **measurable terms**
- It identifies in greater detail the specific aims of the research project, often breaking down what is to be accomplished into smaller logical components
- Specific objectives should systematically address the various aspects of the problem as defined under 'Statement of the Problem' and the key factors that are assumed to influence or cause the problem. They should specify **what** you will do in your study, **where** and **for what purpose.**

Why should research objectives be developed?

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.

Properly formulated objectives will facilitate the development of your research methodology and will help to orient the collection, analysis, interpretation and utilization of data.

Questions and/or Hypotheses

Hypotheses and questions are linked to the speculative proposition of the problem statement, can be inferred from the overall conceptual framework of a study, and are of critical importance to data analysis and interpretation. In research studies, the term hypothesis implies a derivation, within a hypothetic-deductive theoretical system, of a particular assertion or prediction. 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, which is logically related to the same conceptual framework, but which does not necessarily stem from that framework through logical deduction.

Questions are most often used in qualitative inquiry, although their use in quantitative inquiry is becoming more prominent. *Hypotheses* are relevant to theoretical research and are typically used only in quantitative inquiry. A research question poses a relationship between two or more variables but phrases the relationship as a question; a hypothesis represents a declarative statement of the relations between two or more variables. Deciding whether to use questions or hypotheses depends on factors such as **the purpose of the study**, **the nature of the design and methodology of the research**. Make a clear and careful distinction between the dependent and independent variables and be certain they are clear to the reader. Hypotheses are thus tentative statements that should either be acknowledged or rejected by means of research. Because hypotheses give structure and direction to research, the following aspects should be kept in mind when formulating a hypothesis:

- Hypotheses can only be formulated after the researcher has gained enough knowledge regarding the nature, extent and intensity of the problem.
- Hypotheses should figure throughout the research process in order to give structure to the research.
- Hypotheses are tentative statements/solutions or explanations of the formulated problem. Care should be taken not to over-simplify and generalize the formulation of hypotheses.
- The research problem does not have to consist of one hypothesis only. The type of problem area investigated, the scope of the research field are the determinate factors on how many hypotheses will be included in the research proposal.

Literature Review

To conduct research regarding a topic, by implication, means that the researcher has obtained sound knowledge with regard to the research topic. It is therefore imperative that the researcher, at the time of the submission of the research proposal, clearly indicates what theoretical knowledge he possesses about the prospective research.

What is a literature review?

Literature review is *not* a compilation of every work written about a topic. It is *not* simply a list of sources reviewed separately for their own merit. A literature review is a description of the literature relevant to a particular field or topic. It gives an overview of what has been said, who the key writers are, what are the prevailing theories and hypotheses, what questions are being asked, and what methods and methodologies are appropriate and useful. As such, it is not in itself primary research, but rather it reports on other findings.

A literature review uses as its database reports of primary or original scholarship, and does not report new primary scholarship itself. The primary reports used in the literature may be verbal, but in the vast majority of cases reports are written documents. The types of scholarship may be empirical, theoretical, critical/analytic, or methodological in nature. Second a literature review seeks to describe, summarize, evaluate, clarify and/or integrate the content of primary reports.

The stages of a literature review

Define the problem

It is important to define the problem or area which you wish to address. Having a purpose for your literature review will narrow the scope of what you need to look out for when you read.

Carry out a search for relevant materials

Relevant materials will probably comprise a range of media:

- books (monographs, text books, reference books);
- articles from journals, whether print or electronic (but make sure electronic journals have been subject to the peer review process);
- newspaper articles;
- historical records;
- commercial reports and statistical information;
- government reports and statistical information;
- theses and dissertations;
- Other types of information which may be relevant to your particular discipline.

Initial appraisal from raw bibliographical data:

- What are the authors' credentials? are they experts in the field? are they affiliated with a reputable organization?
- What is the date of publication is it sufficiently current or will knowledge have moved on?
- If a book, is it the latest edition?

- Is the publisher a reputable, scholarly publisher?
- If it is a journal, is it a scholarly journal peer reviewed?

Appraisal based on content analysis:

- Is the writer addressing a scholarly audience?
- Do the authors review the relevant literature?
- Do the authors write from an objective viewpoint, and are their views based on facts rather than opinions?
- If the author uses research, is the design sound?
- Is it primary or secondary material?
- Do the authors have a particular theoretical viewpoint?
- What is the relationship of this work to other material you have read on the same topic, does it substantiate it or add a different perspective?
- Is the author's argument logically organized and clear to follow?
- If the author is writing from a practice-based perspective, what are the implications for practice?

How to organize a literature review

There are a number of ways of organizing a literature review. Here is one suggestion:

A. **Introduction:** define the topic, together with your reason for selecting the topic. You could also point out overall trends, gaps, particular themes that emerge, *etc*.
B. **Body:** this is where you discuss your sources. Here are some ways in which you could organize your discussion:
   - ***Chronologically***: for example, if writers' views have tended to change over time. There is little point in doing the review by order of publication unless this shows a clear trend;
   - ***Thematically***: take particular themes in the literature;
   - ***Methodologically***: here, the focus is on the methods of the researcher, for example, qualitative versus quantitative approaches.

C) 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.

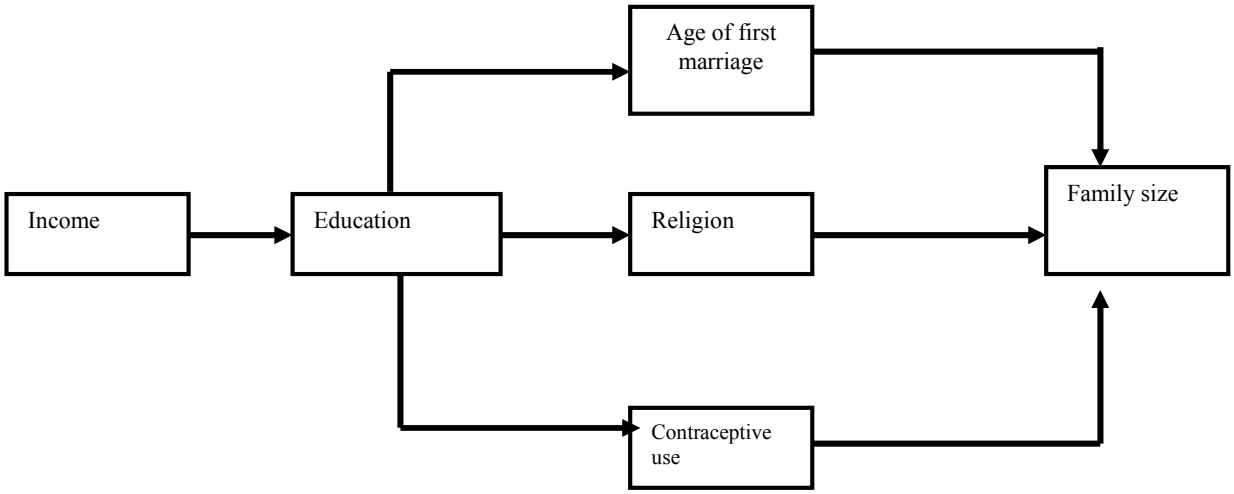
Ask yourself the following type of questions:

- What is the specific research question that my literature review helps to define?
- What type of literature review am I conducting? Am I looking at issues of theory? Methodology? Policy? Quantitative research? Qualitative research?
- What is the scope of my literature review? What types of publications am I using? What discipline am I working in?
- How good was my information seeking? Has my search been wide enough to ensure I've found all the relevant material? Has it been narrow enough to exclude irrelevant material? Is the number of sources I've used appropriate for the length of my paper?

- Have I critically analyzed the literature I use? Do I follow through a set of concepts and questions, comparing items to each other in the ways they deal with them? Instead of just listing and summarizing items, do I assess them, discussing strengths and weaknesses?
- Have I cited and discussed studies contrary to my perspective?
- Will the reader find my literature review relevant, appropriate, and useful?

Conceptual Framework and Definitions

A. **Conceptual framework**: It is the anticipated cause and effect relationship between conceptual variables. Conceptual framework deals with the inter relationship between key variables or issues to be studied. It can be changed or modified. It can be presented using graphs or words as indicated by the following figure.



Graphic Illustration of a Conceptual Framework

Definition of Concepts and Variables

We have two types of definitions: **Conceptual and operational definitions.** A concept is a mental image that summarizes a set of similar feelings or ideas. For example, we experience a bundle of feelings and call it **love.** We see that some people have little to live on and call it **poverty.** Since no concept has any ultimate or real meaning, each of us gives different shades of meanings to the concepts we use. So, conceptual definition is a process of specifying what we mean by terms like poverty, social status, prejudice, alienation etc. Conceptual definition is synonymous with dictionary definition.

Operational definition is the process whereby the researcher specifies empirical observations that may be taken as indicators of attributes contained within a given concept or variable. Operational definitions specify precise operations to be followed in measuring variables.

Methods, material and procedures

The methods or procedures section is really **the heart** of the research proposal. You must decide exactly how you are going to achieve your stated objectives: *i.e.*, what new data you need in order to shed light on the problem you have selected and how you are going to collect and process this data. The activities should be described with as much detail as possible, and the continuity between them should be apparent. Indicate the methodological steps you will take to answer every question, to test every hypothesis illustrated in the Questions/Hypotheses section or address the objectives you set.

What belongs in the "methods" section of a research proposal?

- Information to allow the reader to assess the acceptability of your approach.
- Information needed by another researcher to replicate your experiment.
- Description of your materials, procedure, theory.
- Calculations, technique, procedure, equipment, and calibration plots.
- Limitations, assumptions, and range of validity.
- Description of your analytical methods, including reference to any specialized statistical software.

The proposal should describe in detail the general research plan (may not necessarily be true for all types of research)

- Description of study area
- Description of study design
- Description of study participants
- Eligibility criteria (if any)
- Determination of sample size (if any)
- Description of selection process (sampling method)
- Methods of data collection
- Description of the expected outcome and explanatory variables… (if any)
- How data quality is ensured
- Operational definition
- Presentation of the data analysis methods

Important components of the materials and methods section are described in detail below.

Study design

The study type may dictate certain research designs. More commonly, the study objectives can be achieved through a number of alternative designs. Students have to select the most appropriate and most feasible design. The type of research design chosen depends on:

- the type of problem;
- the knowledge already available about the problem; and
- the resources available for the study.

Generally, there are two main categories of research design:

- Observational study, and
- Experimental or intervention study.

In the observational study, the researchers stand apart from events taking place in the study. They simple observe and record. In the experimental or intervention study, the researches introduce an intervention and observe the events which take place in the study.

Observational studies

An observational study may be:

- Exploratory,
- Descriptive or
- Analytical.

An exploratory study is a small-scale study of relatively short duration, which is carried out when little is known about a situation or a problem. If the problem and its contributing factors are not well defined, it is always advisable to do an exploratory study before embarking on a large-scale descriptive or analytic study. *S*mall-scale studies may be called exploratory case studies if they lead to plausible assumptions about the causes of the problem and explanatory case studies if they provide sufficient explanations to take action.

A descriptive study is an observational study that simply describes the distribution of a characteristic.
An analytical study (correlation in some disciplines) is an observational study that describes associations and analyses them for possible cause and effect.

An observational study may be cross-sectional or longitudinal. In cross-sectional study, measurements are made on a single occasion. In a longitudinal study, measurements are made over a period of time. A longitudinal observational study may be retrospective or prospective. In a retrospective study, the researchers study present and past events. In a longitudinal prospective study, the researchers follow subjects for future events.

Experimental or intervention studies

In the experimental or intervention study, the investigators test the effect of an intervention on the events taking place in the study. An experimental or intervention study may be:

- Controlled or
- Non-controlled.

A controlled experimental study may be randomized or non-randomized. Randomized controlled trials are intervention studies characterized by the prospective assignment of subjects, through a random method, into an experimental group and a control group. Controlled trails without randomization are

intervention studies in which allocation to either experimental or control groups is not based on randomization, making assignment subject to possible biases influence study results.

Plan of Analysis

The main purpose of data analysis is to answer questions or test hypotheses. When data collection methods are decided, the researcher has also to think of data analysis. Data collection and data analysis should not be viewed separately. The type of data analysis depends on the type of data collected. For example statistical analysis needs large sample size, i.e., sample size is one factor affecting type of analysis.

- Qualitative analysis needs small sample size
- Quantitative analysis need large sample size
- Descriptive analysis needs descriptive statistics only
- Explanatory analysis needs inferential statistics

In your analysis plan discuss on:

1) Data preparation and
2) Data analysis procedures

Data preparation – Before analysis, the data should be checked for accuracy. If there are errors in the data they will be reflected in the analysis result and the outcome will be of no use. Data preparation involves:

1. Tabulation = presenting the data in tables (use data matrix)
2. Coding = translating verbal responses in to numerical codes, and all open ended questions should be categorized and coded: E.g. Male= 1 Female= 2
3. Editing for accuracy of data and correctness of table and codes.

Data analysis involves:

1) Variable transformation
2) Descriptive statistics
3) Inferential statistics

Variable transformation refers to creating new variables and categories.
Example:

1. Marital status	New variable
Single	Never married
Married	Ever married
Divorced	
Widowed	
Separated	

2.Academic stand	New variable
Above 3.5	Great distinction
2.75 -3.5	Distinction
1.75 – 2.75	Promoted
1.5 -1.75	Warning
Below 1.5	Dismissal

3. Social Class	New variable
No education Less than $500 income No house	Lower class
Up to secondary education From $501 -1000 income A small house	Middle Class
Tertiary education More than $1000 income Villa house	Upper class

Descriptive statistics are used to describe data quantitatively. **Inferential statistics** is used to make conclusions about the population on the basis of results obtained from sampled data. Statistical inferences are two types:

1) Statistical estimation (point estimation and Interval estimation)
2) Hypothesis testing

Plan for Interpretation

Your discussion of the research design, analysis plan, and literature review will provide you guidelines how to interpret your data. In your plan for interpretation you have to discuss:

A. **Limitations**–What is the limitation or the shortcoming of your study? What problems you faced in your research and what data are lacking to make your generalization complete? Can readers accept your generalizations as it is or with what caution?
B. **G*e*neralizability**: - indicate the target population in time and place to which the results of the study can be generalized.
C. **Potential contribution of the research findings**–What will be the importance of your research result? Who will benefit from the research?

Plans to Report Research findings

1. What reports are to be prepared
   - Interim report (Phase by phase)
   - Final report
   - Publication (Books, Journal, article, news paper)
2. Presentation of reports
   - At seminars/ workshops/conferences
   - Submitted to policy makers
   - Dissemination of findings
   - Publicized on journals/Newspaper and other mass media
   - Put at Libraries
   - Sent to beneficiaries.

Logistics and Budget Breakdown

- Indicate the sources of the fund
- Mention the necessary logistics
- Indicate the anticipated cost breakdown
  - ✓ Personnel (Salary and Perdium)
  - ✓ Supplies & Equipments
  - ✓ Traveling cost
  - ✓ Miscellaneous –unmentioned expenses
  - ✓ Contingency – Cost fluctuation (5 – 10% of total cost)

Work schedule/ time table

The amount of time each step takes should be indicated and you should be committed to accomplish the work according to the timetable.

The steps may include:

- Selecting the sample
- Drafting the questionnaire/instrument
- Training of supervisors and data collectors
- Pre-testing of questionnaire
- Revising the questionnaire
- Printing the questionnaire
- Carrying out data collection
- Coding the data
- Editing the data
- Tabulating the data
- Analyzing the data
- Writing the final report

- Presenting the results

Reference (Bibliography/Literature cited)

All works cited in the proposal are listed either alphabetically or numerically at the end of the document usually under the heading of **"References or Bibliography".** Some conservative authors would like to make distinction between references and bibliography as mentioned below.

- **References:** are lists of literature, which have been cited in the text of a document
- **Bibliography:** includes also items, which were not cited but are relevant to the document.

There are several ways of making citation and recording references. The two main systems of referring are:

A. Harvard System: This system uses author's name, date, and page reference. This system is used mainly by Anthropology, Social science and in life science research**.** Harvard system is commonly used in business research.

B. Vancouver System: uses in-text number instead of an author, date, and page reference. The same *superscript or bracketed text number is given in the text each time the source is cited.* It is used in the applied science such as chemistry, physics and mathematics.

i. Citation

Citation under the Harvard system:
In an investigation conducted in large factories, Gibbs (1993) reported that absenteeism was higher on the night shift than the day.

ii. Referring or listing the cited works
A) Reference for books includes:

- Author's name: Surname (last name) comes first
- Date of publication: year
- Title of the book: underline in type script: Italic or Bold
- Place of publication: city
- Name of publisher: name of company that published the book

E.g., Davidson, Alan. B. (1994), *the Pursuit of Business*, London, Chapman and Halls

But if the author is an Ethiopian, you will write his/her name as it is. For the author named as Tekeste Negash, the reference will be written as:

E.g., Tekeste Negash (1996). Rethinking Education in Ethiopia. Uppsala: Reprocentralem, Hse

When the authors are two, the reference will be written as:
Ebel, R.L and Frisbie, D.A. (1991). Essentials of Educational Measurement (5th ed.) New Jersey: Prentice Hall

For three authors:
Wanna L., Beyene B. and Belete A. (1995). The evolution/technical/programs in Region three. Addis Ababa: FINNIDA.

If the authors are more than three, you will use the abbreviation **'etal'** which means 'and others'.

E.g., Morgan, C-T. etal. (1986). Introduction to Psychology. (7th ed.) New York: Mc Graw Hill, Inc.

When the book is an edited work containing the contribution of many authors, first you have to put the author of the part of the book you took with its title placed under quotation. Then you will write the name of the editor and the book he/she edited.

For example: Hirut Terefe. (1996) "Impacts of displacement on women and children in Ethiopia". In Habtamu Wondimu (ed). The situstion of children and Adolescents in Ethiopia Addis Ababa: AAU printing press.

If the authors are institutions or associations, we will write it as follows:
Ministry of Education. (1995). The Transitional Government of Ethiopia. Education statistics Annual Abstract, 1993/1994 Addis Ababa: MIS

B) Reference for Journal article/Periodical will look as follows:

Author's Name (Publication date). "Title of the article taken". Title of the Journal. Volume, number, page Numbers. Here the publisher and place of publication will not be included.

E.g., Amare Sahle. (2001). "Effects of students' academic competence, self-determination and motivation on school performance in tana Haiq Secondary School". The Ethiopian Journal of Education. Vol.21, No.1 pp.65-93.

C) Encyclopedia Article

If you take ideas from an encyclopedia, you have to follow the procedure like:
Author's Name. (Publication date). "Title of the article". Title of the Encyclopedia. Volume (in capital roman numbers. Page number.

E.g., Dickie, G.T (1967). "Aesthetics." Encyclopedia American. I, 234-238.

D) News Paper Articles

For the news paper articles citation and entries will have the following format.
Author's Name. (Publication date). "Title of the article." Name of the Newspaper. Volume (Number), page.

E.g., Tewodros Kiros. (2001, July 4). "Introducing Democracy." The Reporter. 592520,4

E) Article in Magazines

Citation of ideas taken from magazines takes the following format:
Author's name. (Publication Date). "Title of the Article." Name of the Magazine. Volume (Number), page.

F) Unpublished Materials

Sometimes you may take ideas from officially unpublished materials. In this case you can use the sources as follows.
E.g., Dawit Asrat. (2000). "Teachers concerns with respect to sex, qualification and experience: The case of Addis Ababa Region." (Unpublished MA Thesis) Addis Ababa: Addis Ababa University.

G) Other reference

It is possible to cite quote or paraphrase unpublished work if they are relevant to the study. Unpublished works are:

- Personal communication with experts (professionals).
- Unpublished data collected by other researchers
- Public speeches
- Conferences discussion and the like

The researcher should not put such an unpublished work in reference list unless it has been fully approved and a date set for its publication. Unpublished references are not usually found or catalogued in libraries. And such unpublished reference should be placed in the body of the text, not in the reference list. Use parenthesis to enclose the complete name of the author, the year (if available) and appropriate tattle, location, or other information needed to establish the authenticity of the reference or help the reader locate it.

E.g. "……." (David Lee, Cornell University, 1995 personal Communication)
It is also possible to use numbered footnote and will be referred to by using the number as a superscript at the proper position.

9. Appendix (Annex)

It is not mandatory to have this section. If the researcher thinks that having this section will increase the quality of the research proposal he is free to do so. Information types provided in this section are those additional details, which are difficult to accommodate within the standard headings.

Stuffs to be included in appendix:

- Detail Questionnaires and interview schedules
- Detailed experimental design (in experimental research)
- Detailed statistical procedures
- Samples of research materials (chemical and some biological materials)
- Survey and other geographic maps

CHAPTER SIX

SAMPLING DESIGN AND PROCEDURE

The statistical investigation can take two forms: Sample survey and census survey. If the researcher studies every unit of the field of study (survey) and drive conclusion by computing the sum of all units. This type of survey is called **census survey**. Or if the researcher studies only a unit in the field of survey and this type of survey is called **sample survey**. In sample technique of survey some unit are taken as representative of the whole field of domain and the conclusion of the sample is extended to the whole population.

Some fundamental definitions

Before going to details and uses of sampling it is appropriate to be familiar with some basic definitions concerning sampling.

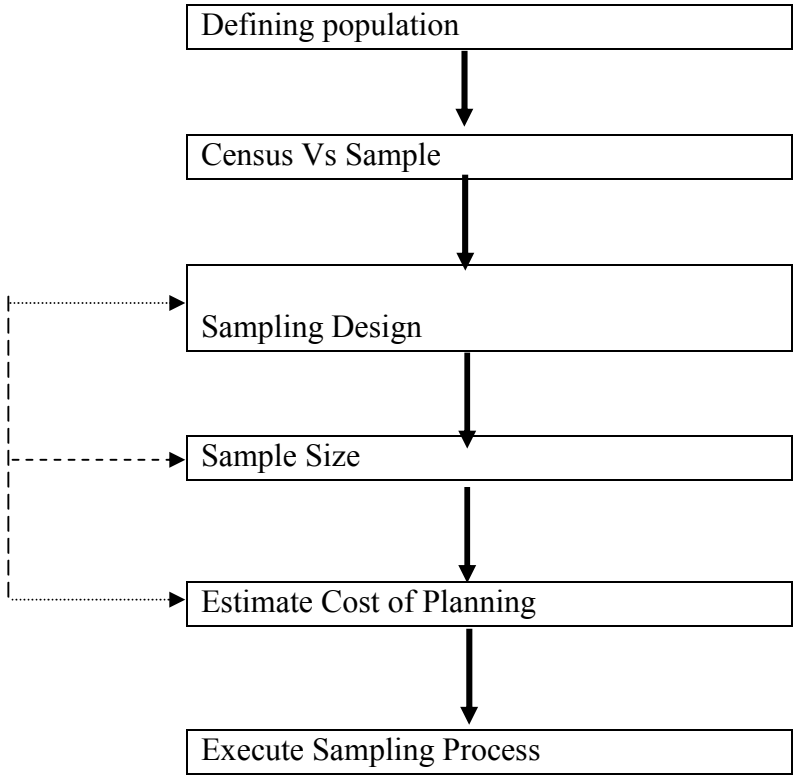
- **Target population (reference population)**: Is that population about which an investigator wishes to draw a conclusion.
- **Study population (population sampled)**: Population from which the sample actually was drawn and about which a conclusion can be made. For Practical reasons the study population is often more limited than the target population. In some instances, the target population and the population sampled are identical.
- **Sampling unit**: The unit of selection in the sampling process. For example, in a sample of districts, the sampling unit is a district; in a sample of persons, a person, etc.
- **Study unit**: The unit on which the observations will be collected.

N.B. The sampling unit is not necessarily the same as the study unit.

- **Sample design**: Is a definite plan for obtaining a sample frame.
- **Sampling Frame**: Is the list of elements from which the sample is drawn
- **Sampling**: Is the process of using a small number or part of a larger population to make conclusion about the whole population.

6.1. Steps involved in sample planning (Sampling procedure)

The first thing that the sample plan must include is a definition of the population to be investigated. This involves the following procedure.



i. Defining the population

The first thing the sample plan must include is a definition of the population to be investigated. Defining the target population implies specifying the subject of the study. Specification of a population involves identifying which elements (items) are included, as well as where and when. If the research problem is not properly defined then defining population will be difficult. Thus, the researcher must begin with careful specification of his population.

ii. Census Vs Sample

Once the population has been defined, the researcher must decide whether the survey is to be conducted among all members of the population or only a subset of the population. That is, a choice must be made between census and sample.

Advantages of census

- **Reliability**: Data derived through census are highly reliable.
- **Detailed information**: Census data yield much more information.

Limitation of census

- **Expensiveness**: Investigating each elements of the population is expensive to any individual researcher.
- **Excessive time and energy**: Beside cost factor, census survey takes too long time and consumes too much energy.

Need for sampling

The use of sample in research project has the objective of:

- estimating;
- testing and
- Making inference about a population on the basis of information taken from the sample.

Sampling can save time and money (it is economical than census). Sampling may enable more accurate measurement, because sample study is generally conducted by trained and experienced investigator. Sampling remains the only way when population contains infinitely members. It usually enables to estimate the sampling error and, thus, assists obtaining information concerning some characteristics of the population.

If the choice of sample units is made with due care and the matter under survey is not heterogeneous, the conclusion of the sample survey can have almost the same reliability as those of census survey.

Sampling technique also enables researchers to obtain detailed study, as the number of sample units is fairly small these can be studied intensively and elaborately.

When taking a sample, we will be confronted with the following questions:

a) What is the group of people from which we want to draw a sample?
b) How many people do we need in our sample?
c) How will these people be selected?

Limitations of sampling technique

- **Less accuracy**: In comparison to census technique the conclusion derived from sample are more liable to error. Therefore, sampling technique is less accurate than the census technique.
- **Misleading conclusion**: If the sample is not carefully selected or if samples are arbitrarily selected, the conclusion derived from them will become misleading if extended to all population.
- **Need for specialized knowledge**: The sample technique can be successful only if a competent and able scientist makes the selection. If it is done by average researcher the selection is liable to error.

A beginner researcher commonly asks himself when and where sampling technique is appropriate to his study. Sampling technique is used under the following conditions.

- **Vast data**: When the number of units is very large, sampling technique must be used. Because it economize money, time and effort.
- **When at most accuracy is not required**: The sampling technique is very suitable in those situations where 100% accuracy is not required, otherwise census technique is unavoidable.
- **Infinite population**: If the population is unlimited sampling technique is imminent.
- **When census is impossible**: If we want to know the amount of mineral wealth in a country we cannot dig all mines to discover and count. Rather we have to use the sampling technique.
- **Homogeneity**: If all units of the population are alike (similar) sampling technique is easy to use.

Essentials of an ideal sample

An ideal sample should fulfill the following four basic characteristics.

- **Representativeness**: An ideal sample must represent adequately the whole population. It should not lack a quality found in the whole population.
- **Independence**: Each unit should be free to be included in the sample
- **Adequacy**: The number of units included in the sample should be sufficient to enable derivation of conclusion applicable for the whole population. A sample having 10% of the whole population can be considered.
- **Homogeneity**: The element included in the sample must bear likeness with other element.

iii. Sample design

Operationally, sample design is the heart of sample planning. Specification of sample design includes the method of selecting individual sample unit involves both theoretical and practical considerations. Sample design should answer the following:

- **What type of sample to use**? Different types of samples are considered, examined and appropriate sampling technique is selected.
- **What is the appropriate sample unit**? Is a single element or group of elements of the defined population are subjected to selection in the sample? Sampling unit can be:
  - **Primary sampling unit**: Units selected in the first stage of sampling.
  - **Secondary sampling unit**: A unit selected in the second stage of sampling.

iv. Sample Size Determination

A researcher is worried about sample size because of the fact that sample size (number of elements in sample) and precision of the study are directly related. The larger the sample size the higher is the

accuracy. The sample size determination is purely statistical activity, which needs statistical knowledge. There are a number of sample size determination methods.

- **Personal judgments**: The personal judgment and subjective decision of the researcher in some cases can be used as a base to determine the size of the sample.
- **Budgetary approach**: Under this approach the sample size is determined by the available fund for the proposed study.

E.g., if cost of surveying of one individual or unit is 30 birr and if the total available fund for survey is say 1800 birr , the sample size then will be determined as,

Sample size (n) = total budget of survey /Cost of unit survey, accordingly, the sample size will be 60 units (1800 / 30 = 60 units)

- **Traditional inferences**: This is based on:
  - ❖ Precision rate and
  - ❖ Confidence level.

To estimate sample size using this approach we need to have information about:

- ❖ the estimated variance of the population,
- ❖ the magnitude of acceptable error and
- ❖ the confidence interval

Variance or heterogeneity of the population: It refers to the standard deviation of the population parameter. The sample size depends up on the variance of the population. If the population is similar (homogenous) small sample size can be enough.

E.g., Predicting the average age of college students vs predicting average age of people visiting a given supermarket at a given day.

If information about variance is not available a researcher is expected to estimate it. Estimation of the variance or standard deviation is not an easy undertaking. The researcher can carry out either pilot study for the purpose of estimating the population standard deviation or he can use the rule of the thumb. According to the rule of the thumb standard devotion is one-sixth of the range.

E.g., If the households yearly average income is expected to range between 1500 and 24000 birr, using the rule of the thumb the standard deviation will be 1/6(22500) = 3750 hence range equal 22500 (24000-1500)

Magnitude of acceptable error: The magnitude of error (range of possible error) indicates how precise the study must be. It is acceptable error for that study. The researcher makes subjective judgment about the desired magnitude of error.

E.g., to estimate the average income of household one may allow an error says ± 50

Confidence interval: In most case (research) 95% confidence level is used. That is, it is assumed that 95 times out of 100 the estimate from sample will include the population parameter.

Once the above concepts are understood and determined the size of sample is quite simple to determine. It is determined based on the following relationship.

For mean $n = (ZS/E)^2$ and
For proportion $n = Z^2 p.q /e^2$

Where Z represents standardization value indicating a confidence level
E represents acceptable magnitude of error ± an error factor
S represents sample SD or an estimate of the population SD
p and q are proportion and n represent sample size

E.g., the household yearly income expected to range from 1000 – 25000. The SD based on rule of thumb, range = 24000 *1/6 = 4000

Suppose we want to study the household monthly expenditure on food. We wish to have a 95% confidence level and acceptable range of error of no less than 20 birr. And the estimated value of the SD is 200.

i.e. Z[1] = 1.96
E = 20
S = 200
$n = (ZS/E)^2 = (1.96 *200/20)^2 = 384.16$ or 385

If the range of error (E) is reduced to 10-sample size will increase.

In order to calculate the required sample size, you need to know the following facts:

- The reasonable estimate of the key **proportion to be studied**. If you cannot guess the proportion, take it as 50%.
- The **degree of accuracy required**. That is, the **allowed deviation from the true proportion in the population** as a whole. It can be within 1%, 5% or 10% etc.
- The **confidence level** required, usually specified as 95%.

[1] $\mu = X^* \pm 1.96\ \sigma \div \sqrt{n}$ at 95% confidence level. Where, μ = Population Mean , X* = Sample Mean, σ = Standard Deviation, n = Sample size, √ = square root.
Also, Z= 2.58 at 99%, Z= 1.96 at 95%, Z = 1.65 at 90%.

- The **size of the population that the sample is to represent**. If it is more than 10,000 the precise magnitude is not likely to be very important; but if the population is less than 10,000 then a smaller sample size may be required.
- The difference between the two sub-groups and the value of the likelihood or the power that helps in finding a statistically significant difference.

Note that 'e' is required when there are two population groups and the interest is to compare between two means or proportions.

Estimating a proportion

- Estimate how big the proportion might be (p)
- Choose the margin of error you will allow in the estimate of the proportion (say ± w)
- Choose the level of confidence that the proportion in the whole population is indeed between (p-w) and (p+w). We can never be 100% sure. Do you want to be 95% sure?
- The minimum sample size required, for a very large population (**N>10,000**) is:

$$\mathbf{n = Z^2\, p\,(1\text{-}p) / w^2}$$

If the proportion of a target population with a certain characteristics is 0.50, the z statistics is 1.96 and we desire accuracy at 0.05 level. Then the sample size is:

$n = z^2\, pq/d^2$
$n = (1.96)^2\, (0.50)\, (0.50)/d^2$
$\underline{n = 384}$

Example (Prevalence of diarrhea)

a) p = 0.26, w = 0.03, Z = 1.96 (i.e., for a 95% C.I.)

$$n = (1.96)^2\, (0.26 \times .74) / (0.03)^2 = 821.25 \approx 822$$

Thus, the study should include at least 822 subjects.

If N (the entire population) is less than 10,000, the required sample size will be smaller. In such cases, calculation of final sample estimate (n_f) using the following formula:

$$nf = \frac{n}{1+(n/N)}$$

Where: n_f= the desired sample size (N<10,000)
n= the desired sample size (N> 10,000)
N= estimate of population size

Example:
If n were found to be 400 and if the population size were estimated at 2000, then n_f would be calculated as follows:

$$nf = \frac{n}{1+(n/N)}$$

$$= \frac{400}{1+(400/2000)}$$

n_f= 333

Example 2
A hospital administrator wishes to know what proportions of discharged patients are unhappy with the care received during hospitalization. If 95% Confidence interval is desired to estimate the proportion within 5%, how large a sample should be drawn?

$n = Z^2\, p(1-p)/w^2 = (1.96)^2(.5\times.5)/(.05)^2 = 384.2 \approx$ **385 patients**

N.B. If you don't have any information about p, take it as 50% and get the maximum value of pq which is 1/4 (i.e., 25%).

v. Cost of Sampling

The sample plan must take into account the estimated cost of sampling. Such costs are of two types: **overhead costs** and, **variable costs**. In reality however, it may be difficult and even for some people not reasonable to separate sampling cost from over all study cost.

vi. Execution of sampling process

The last step in sample planning is the execution of the sample process (procedure). In short the sample is actually chosen. The actual requirement for sampling procedure:

- **Sample must be representative**: When it is a representative, a sample will be relatively small pieces of the population that mirror the various patterns and subclasses of the population.
- **Sample must be adequate**: A sample is adequate when it is of sufficient in size to provide confidence in the stability of its characteristics.

6.2. Sampling Techniques

Sampling techniques are basically of two types namely:

- non-probability sampling and
- Probability sampling.

6.2.1 Non-probability Sampling

Non-probability sampling technique does not give equal chance that each element of the population will be included in the sample. Units are selected at the discretion of the researcher. Such samples derive their control from the judgment of the researcher. Some of the disadvantages of non-probability sampling are of the following:

- No confidence can be placed in the data obtained from such samples; they don't represent the large population. Therefore, the result obtained may not be generalized for the entire population.
- Non-probability sampling depends exclusively on uncontrolled factors and researcher's insight, and there is no statistical method to determine the margin of the sampling errors.
- Sometimes such samples are based on an absolute frame, which does not adequately cover the population.

The advantages of non-probability sampling on the other hand is that it is much less complicated, less expensive, and a researcher may take the advantage of the available respondents without the statistical complexity of the probability sampling. Moreover it is very convenient in the situation when the sample to be selected is very small and the researcher wants to get some idea of the population characteristics

Non-probability sampling can be adequate if the researcher has no desire to generalize his findings beyond the sample, or if the study is merely a trial run for larger study (in preliminary research).

There are number of non-probability sampling.

- Quota Sampling
- Judgment sampling
- Snowball sampling
- Convenience sampling

1. Quota sampling

Under this sampling approach, the interviewers are simply given quotas to be full-filled from the different strata (groups).

E.g., an interviewer in a particular city may be assigned say 100 interviews. He will assign this to different subgroups (say 50 for male respondents and 50 for female respondents).

Even though quota sampling is not probabilistic, the researcher must take precaution to keep from biasing selection and makes sure that the sample is as representative and generalize-able as possible.

2. Judgment (Purposive or deliberate) sampling

In this approach the investigator has complete freedom in choosing his sample according to his wishes and desire. The experienced individual (researcher) select the sample based upon his judgment about some appropriate characteristics required from the sample members.

The intent is to select elements that are believed to be typical or representative of the population in such a way that error of judgment in the selection will cancel each other out. The researcher selects a sample to serve a specific purpose, even if this makes a sample less than fully representative.

The key assumption underling in this type of sampling is that, with sound judgment of expertise and an appropriate strategy, one can carefully and consciously choose the element to be included in the sample.

Its advantage is its low cost, convenient to use, less time-consuming, and as good as probability sampling. However, its value depends on entirely on the expert judgment of the researcher.

Weakness of this approach is that without an objective basis for making the judgment or without an external check, there is no way to know whether the so-called typical cases are, in-fact, typical and its value is entirely depends on the judgment of the researcher.

3. Snowball Sampling

It is also known as Multiplicity sampling. The term snowball comes from the analogy of the snowball, beginning small but becomes bigger and bigger as it rolls downhill. Snowball sampling is popular among scholars conducting observational research and in community study.

The major purpose of snowball sampling is to estimate characteristics that are rare in the total population. First initial respondents are selected randomly but additional respondent are then obtained from referrals or by other information provided by the initial respondent.

E.g., consider a researcher use telephone to obtain referral. Random telephone calls are made; the respondents (answering the call) are asked if they know someone else who meets the studies

respondent qualification. Like “whether they know the someone who survived the September eleven terrorist attack in New York “

SAY,

A researcher wants to study the impact of the September Eleven Terrorist attack on the social life and life style of the survivals.

Major advantages of this type sampling are that it substantially increases the probability of finding the desired characteristic in the population and lower sampling variance and cost.

4. Convenience Sampling

This is a "hit or miss" procedure of study. No planned effort is made to collect information. The researcher comes across certain people and things and has transaction with them then he tries to make generalization about the whole population. This sampling technique is not scientific and has no value as a research technique. However, as it is characterized by "hit or miss" method sometimes hits are secured. In general, the availability and willingness to respond are the major factors in selecting the respondents. Commonly such a sample is taken to test ideas or even to gain ideas about a subject of interest.

6.2.2. Probability Sampling

All probability samples are based on chance selection procedures. Chance selection eliminates the bias inherent in the non-probability sampling procedure, because this process is random. The procedure of randomization should not be thought as unplanned or unscientific. It is rather the basis of all probability sampling technique.

Probability sampling is the most preferred type of sampling because of the following characteristics

- The sample units are not selected based on the desecration of the researcher
- Each unit of the population has some known probability of entering the sample
- The processes of sampling is automatic in one or more steps of selection of units in the sample

There are number of probability sampling some of them are discussed below:

- Simple Random Sampling
- Systematic Sampling
- Stratified Sampling
- Cluster Sampling
- Multi-stage Sampling

1. Simple Random Sampling

It is the basic sampling method in every statistical computation. Each element in the population has an equal chance of being included in the sample. It is drawn by a random procedure from a sample frame. Drawing names from a hat is a typical simple random sampling technique. The sampling process is simple because it requires only one stage of sample selection.

Selecting random sample is made in such a way that. Each element in the sample frame is assigned a number. Then each number is written on separate pieces of paper, properly mixed and one is selected. If say the sample size is 45, then the selection procedure is repeated 45 times. When the population is consists of a large number of elements table of random digits or computer generated random numbers are utilized.

2. Systematic Sampling

Systematic sampling involves only a slight difference from simple random sampling. The mechanics of taking a systematic sample are rather simple. If the population contains N ordered elements, and sample size of n is required or desired to select, then we find the ratio of these two numbers, i.e., N/n to obtain the sampling interval.

E.g., Say the population size N= 600 and the desired sample size is 60 (n = 60), then the sample interval will be 600/60 = 10.

Random number at the 10 interval will be selected, i.e., if the researcher starts from the fourth element then 4^{th}, 14^{th}, 24^{th} etc, elements will be selected.

Systematic sampling assumes that the population elements are ordered in the same fashion (like names in the telephone directory). Some types of ordering, such as an alphabetic listing, will usually be uncorrelated with the characteristics (say income family size) to be investigated. If the arrangement of the elements of the sample is itself random with regard to the characteristics under study, systematic sampling will tend to give result close to those provided by simple random sampling. We say close for the reason that, in systematic sampling all elements of the population do not have the same or equal chance of being included. Systematic sampling may increase representativeness when items are ordered with regard to the characteristics of interest

E.g., if the populations of customer group are ordered by decreasing order of purchase volume, a systematic sample will be sure to contain some high-volume and some low-volume customers.

The problem of periodicity occurs if a list has a systematic pattern, that is, if the list is not random in character (like cyclical or seasonal pattern).

E.g., consider collecting retail store- sale volume, if the researcher is to choose a sampling interval of seven days, his choice of day can result in sampling that would not reflect day-off- the week variation in sale.

3. Stratified Sampling

This method of sampling is a mixture of deliberate and random sampling technique. If population from which the sample to be drawn does not constitute a homogeneous group, stratified sampling technique is used in order to obtain a representative sample. Under this technique, the population is divided into various classes or sub-population, which is individually more homogeneous than the total population. The different sub-populations are called strata. Then certain items (elements) are selected from the classes by the random sampling technique. Since each stratum is more homogeneous than the total population, we are able to get more precise estimate for each stratum. By estimating more accurately each of the component parts of population (sub population), we get a better estimate of the whole population. In other words the population will be broken into different strata based on one or more characteristics say, frequency of purchase of a product or types of customers (credit card versus non-credit card), or the industry. Thus, we will have strata of customers, strata of industry etc.

Suppose a researcher wishes to collect information regarding income expenditure of the male population of, say Jimma Town.

First we shall split the whole male population in the town into various strata on the basis of, say special professions like:

- Class of service giving people
- Business men
- Shop keepers

From these different groups the researcher will select elements using random sample technique.
The following questions should be considered in the context of stratified sampling

How to form strata?

We can say that strata can be formed on the basis of common characteristics of the items (elements) to be put in each stratum. Various strata are formed in such a way as to ensure element being more homogeneous within each stratum.

Thus, strata are purposively formed and are usually based on past experience and personal judgment of the researcher.

How should items (elements) be selected from each stratum?

The usual method for selection of items for the sample from each stratum is that of simple random sampling. Systematic sampling can also be used if it is considered more appropriate in certain situation.

How many items to be selected from each stratum (sample size)?

Stratified sample size can be made proportionate to its size in which case the sample that is drawn from each stratum is made proportionate to the relative size of that stratum.

E.g., suppose Pi the proportion of population included in stratum i and n represents the total sample size, the sample size of stratum i will then be pi*n

Stratified sample size can also be made disproportionate to its size. That is, the sample size from each stratum is made based on other circumstance such as based on the relative variance of stratum.

Here we take large sample size from more variable strata (heterogeneous).

$$n_i = n^* N_i\sigma_1 / N_1\sigma_1 + N_2\sigma_2 + N_3\sigma_3 + \ldots N_k\sigma_k$$

Where σ_1 σ_2, σ_3, $\ldots\sigma_k$ denote the standard deviation of the k strata, N_1 , N_2, $N_3 \ldots N_k$ the size of the k strata, n_i denote the sample size of the k strata and n the total sample size.

Generally, the procedure in Stratified sampling can be summarized as follow:

- The entire population is first divided into a set of strata (sub-population groups), using some external sources, such as census data;
- Within each stratum a separate random sample is selected;
- From each separate sample, some statistics (mean) is computed and properly weighted to form an overall estimated mean for the whole population
- Sample variances are also computed within each separate stratum and appropriately weighted to yield a combined estimate for the whole population.

4. Cluster sampling

This technique will sample economically while retaining the characteristics of a probability sampling. In cluster sampling the primary sampling unit is no more the individual elements in the population rather it is say manufacturing unit, city or block of city, etc.

After randomly selecting the primary sample unit (city, part of city), we survey or interview all families or elements in that selected primary sample unit. The area sample is the commonly used type of cluster sampling.

E.g., suppose we want to estimate the proportion of machine-parts in an inventory, which are defective. Assume that there are about 20000machine parts in the inventory. They are stored in 400 cases of each containing 50 parts each.

Now using a cluster sampling, we would consider the 400 cases as clusters. From this cluster we randomly select say n cases and examine all the machine-parts in each randomly selected case.
Cluster sampling clearly will reduce costs by concentrating survey in selected cluster. But it is less precise than random sampling. Cluster sampling is used only because of the economic advantage it possesses.

5. Multi-stage sampling

Items are selected in different stage at random. Multi stage sampling is a further improvement over cluster sampling.

E.g., If we wish to estimate say yield per hectare of a given crop say coffee in Jimma zone. We begin by random selection of say 5 districts in the first instance.
Of these 5 districts, 10 villages per district will be chosen in the same manner. In final stage we will select again randomly 5 farms from every village. Thus, we shall examine per hectare yield in a total of 250 farms all over that region.
Zone or region

District (5) → first stage

Village (10 /district) → second stage

Farm (5 farms/ village) → third stage

There are two advantages of this sampling technique. It is easier to administer than most sampling technique. A large number of units can be sampled for a given cost because of sequential clustering, whereas this is not possible in most sample design.

Multi-stage sampling is relatively convenient, less time consuming and less expensive method of sampling. However, an element of sampling bias gets introduced because of unequal size of some of the selected sub-sample. This method is recommended only when it would be practical to draw a sample with a simple random sampling technique.

6.3. Sampling Error and Non Sampling Error

Sampling study subjected to sampling and non-sampling errors, which are of random and/or of a constant in nature. The error created .due to sampling and of which the average magnitude be determined are called sampling error, while others are called sampling bias.

6.3.1. Sampling Error

Sampling error is the difference between the result of a sample and the result of census. It is the difference between the sample estimation and the actual value of the population. These are errors that are created because of the chance only. Although the sample is properly selected, there will be some difference between the sample statistics and the actual value (population parameter). The mean of the sample might be different from the population mean by chance alone. The standard deviation of the sample might also be different from the population standard deviation. Therefore, we can expect some difference between the sample statistics and the population parameter. This difference is known as sampling error. To illustrate this let us take a very simple example. Suppose an individual student has scored the following grades in 10 subjects (Consider these subjects as population); 55, 60, 65, 90, 55, 75, 88, 45, 85, 82. Say, a sample of four grades 55, 65, 82, and 90 are selected at random from this population to estimate the average grade of this student. The mean of this sample is 73. But the population mean is 70. The sampling error is therefore, 73 - 70 = 3. However, the variation due to random fluctuation (sampling error) decreases as the sample size increases though it is not possible to completely avoid sampling error.

6.3.2. Systematic Error (non-sampling error)

Systematic sampling is also called sampling bias. Such error can be created from errors in the sampling procedure, and it cannot be reduced or eliminate by increasing the sample size. Such error occurs because of human mistakes and not chance variation. The possible factors that contribute to the creation of such error include inappropriate sampling frame, accessibility bias, defective measuring device, and non-response bias or defects in data collection.

1) **Inappropriate sampling**: If the sample units are a misrepresentation of the population; it will result in sample bias. This could happen when a researcher gathers data from a sample that was drawn from some favored locations. It occurs when there is a failure of all units in the population to have some probability of being selected for the sample.
2) **Accessibility bias**: In many research studies, researchers tend to select respondents who are the most accusable to them. When all members of the population are not equally accessible, the researcher must provide some mechanism of controlling in order to ensure the absence of over and under-representation of some respondents.
3) **Non-response bias**: This is an incomplete coverage of sample or inability to get complete response from all individuals initially included in the sample. This is due to the failure in locating some of

the individuals of the sample element or due to their refusal to respond. In some cases, respondents may intentionally give false information in response to some sensitive question. For instance, people may not tell the truth of their bad habit and income.

Maximizing accuracy requires that total study error be minimized.

Total error = sampling error + Non-sampling Error

Total error is usually measured as total error variance, also known as mean square (MSE)[2]

$(TE)^2 = (SE)^2 + (NE)^2$

Generally, non-sampling errors occur in a sample survey as well as in census survey whereas the sampling error occurs only in a sample survey. Preparing the survey questionnaire and handling the data properly can minimize non-sampling error.

[2] For more information refer Zikmund (1998)

CHAPTER SEVEN

SOURCES OF INFORMATION

Any research is based on various types of information. The more information the researcher has about the better will be his/her investigation and explanation about it. Without information no investigation will be made.

In order to carry on any research activity, information should be gathered from proper sources. The more valid is the sources of information, the more reliable will be the information received, which in turn, will lead to correct and reliable conclusion.

Different authors have classified the sources of information differently. Some of the most important views are of the following:

According to P.V. Young: The sources of information can be classified into:

- **Documentary sources:** These include books, manuscripts diaries and letters. Documents first written out (not published yet) or not printed are also included here.
- **Field sources:** The information given by individual, obtained from field experiment, survey and observation

According to W. A. Bagley, the sources of information in the field of social science may be classified into:

- **Primary source**: Include the actual information received from individuals directly concerning the problem of the study. It also includes observed social phenomenon and facts that may be discovered.
- **Secondary sources of information**: These include all types of published and unpublished, public or private documents and other such types of information.

According to G.A. Lundberg: The sources of information may be classified as:

- **Historic sources**, which includes sources representing the past incident, for example, documents, papers and stone inscriptions concerning past articles discovered through excavations.
- **Field sources**: Include information received from concerned persons and also through the observation of their behavior.

Generally, the sources of information are of two types:

- **Primary sources and**
- **Secondary sources of information.**

Primary sources of information: The information obtained from primary sources is often called as **primary data.**

Primary data: Are those information gathered by researcher himself and are gathered for the first time, thus, happening to be original. The sources of such information are individuals and the incidence around them.

These data are obtained by means of questionnaires and schedules or some other techniques. In some fields primary data are collected through interview and observation method. The observation method, for collecting primary data, may be either participant or non-participant.

Such data are known as primary because they are gathered by the researcher himself from the field of research directly and for first time.

Secondary sources of information: These sources of information are called "secondary data". Secondary data are those, which have already been collected by someone and which, have already been passed through statistical process.

Secondary data are information, which are gathered or obtained indirectly. The researcher does not obtain them himself or directly rather he gathered them from published and unpublished material. Secondary data are collected by the individuals and/or institution for their own use through personal diaries, letters and survey documents etc.

The primary sources of secondary data are:

- Personal document such as diaries, letters, photographs and so on.
- Public documents such as books, manuscripts, records, census reports of survey by private and public institution and various information published in newspapers and magazines.

CHAPTER EIGHT

METHODS OF DATA COLLECTION: PRIMARY SOURCES

The task of data collection begins after a research problem has been defined and research design/plan worked out. Before deciding the method of data collection, the researcher should be aware of the existence of two types of data i.e., primary and secondary data. The researcher has to decide which sort of data he/she will be using for his study and accordingly he has to select one or the other method of data collection.

The method of collecting primary and secondary data is different. Primary data are to be originally collected, while secondary data are not.

Collection of primary data

We collect primary data during the course of doing experiment in an experimental research. But in case of non-experimental research a researcher conducts survey to obtain primary data either through:

- Observation
- Direct communication with respondent in one form or another
- Personal interview

There are several method of collecting primary data particularly in survey and descriptive research. Commonly used methods of collecting primary data are discussed below.

- Observation method
- Interview
- Self-administered Questionnaires
- Schedule (Interview Questionnaires)
- Focus Group Discussion (FGD)
- In-depth interview, etc.

8.1. Observation

Observation is the primary source of information especially in studies related to behavioral science. We all observe things around us, but this type of observation is not scientific observation.
Observation becomes scientific tools and methods of data collection:

- When it serves a formulated research purpose;
- When it is systematically planned and recorded;
- And it is subject to checks and controls on validity and reliability.

Under this method the researcher should personally and directly observe the condition and incidence of his fields of study. The researcher would not ask anything from respondents. For example, in a study related to consumers' behavior, the investigator instead of asking the brand of say, wristwatch used by the respondent may himself look at the watch.

Direct observation is the most reliable method for gathering information related to the life style, status, conduct, behavior, language, custom and tradition and the like phenomenon. The observer should be absolutely detached and objective in gathering facts

The main advantages of direct observation

- Information obtained under this method relates to what is currently happening. It is not complicated by the either the past behavior or future intention or attitude.
- It is independent of respondents and is not demanding the active cooperation of the respondents.

Limitation of observation method

- It is an expensive method
- The information provided by this method is very limited
- Sometimes unforeseen factors may interfere with the observation task
- Some people or phenomenon are rarely accessible to direct observation

The researcher using this method should decide priory:

- What should be observed?
- How the observation should be recorded?
- How the accuracy of observation can be ensured?

8.1.1. Participant Vs Non-participant observation

Participant observation: The researcher lives in the group or in the community as a member of it and participates in their life. He experiences what the member of the group experience.

Advantages of this approach

- The researcher is enable to record the natural behavior of the group;
- The researcher can even gather information which could not easily be obtained if he observe in a disinterested fashion;
- The research can verify the truth of the statement made by informant in the context of the study

Limitation of this method

- The observer may loss the objectivity to the extent he participate emotionally;
- The problem of observation control is not solved;

- It may narrow down the researcher's range of experience.

Non-participant observation: The researcher does not participate in the group life but observe as an external spectator. Under such approach the presence of the researcher is unknown to the people.

Advantages of this approach

- Check and control is possible
- Since the observer is not a part of a group he is less subjective
- Wider range of experience can be obtained

Limitation of this approach

- Internal information cannot be obtained
- Since the presence of the observer is known, it is very hard to observe the natural behavior of the observed object

The choice between participant and non-participant observation depends up on factors like:

- Purpose of the study (type of the study);
- The cost of the research or availability of fund to carry out the research;
- Availability of time (time consideration);
- Accessibility of the group or community (whether it is possible to be a part of a community or that group);
- Convenience to the observer.

8.1.2. Control Vs uncontrolled observation

Uncontrolled observation: Is the observation, which takes place in natural setting. Here no attempt is made to use precision instruments. The main aim of this type of observation is to get a spontaneous picture of life or person. The main weakness of uncontrolled observation is that of subjective interpretation.

Controlled observation: Observation takes place according to definite pre-arranged plans, including experimental procedure. In this observation we use mechanical (or precision) instruments as aids to accuracy and standardization. Controlled observation takes place in various experiments that are carried out in a laboratory or under controlled condition.

8.1.3. Structured Vs Unstructured

A) Structured Observation: It is structured and preplanned observation technique. This observation is characterized by a careful definition of units, the style of recording the observation information; standardize conditions of observation and the selection of pertinent observation. Such observation is

appropriate in descriptive research. The approach followed in the observation process is specified in detail. It includes:

- The behavior to be observed
- The unit of observation
- Subject of observation (women, adult, etc)

Conditions of observation (time of observation, place of observation, approaches of observation, etc Style of recording the observed information and the like are predetermined. In general, such observation has standardized format and is pre-planned.

B) Unstructured observation: The observation takes place without the characteristics mentioned above, i.e., without standardized format and plan. There is no specification of subject of observation, behavior to be observed and no standard format for recording the observed information.
Such observation is very much flexible and commonly used in exploratory research.

Advantage of Unstructured observation method
The main advantage of this method of data collection is that, information obtained relates to what is currently happening. That is, it is not complicated by either the past behavior or future intention or attitude.

Limitations of Unstructured observation method

- It is an expensive method;
- The information provided by this method is very limited;
- Sometimes unforeseen factors may interfere with the observation task;
- Some people or phenomenon are rarely accessible to direct observation;
- The problem of subjected interpretation of the observed matter is not solved;
- Recording problem is not solved either.

Some suggested methods of recording the observed information

- Write down on a prepared recording format, which can be, on the spot (during observation or later after each observation).
- Motion picture like video camera or still camera.

8.2. Interview

In an interview, the researcher meets people and discusses his social economic or some other problem with them. During the courses of discussion, he gathers facts. An interview is different from Schedules (interview questionnaires). A schedule includes some predetermined questions asked by the researcher in a definite order without change. But the interview has no such definite form or order of question.

The researcher may ask any question on the basis of his insight into the problem. Interview can be either:

- **Personal interview** or
- **Interview through telephone**.

8.2.1. Personal Interview

Such method requires interviewer-asking question in face-to-face contact to respondent. The interviewer has to be on the spot and has to meet people from whom the data are collected. This approach is suitable for intensive investigation. But in certain cases it may not be possible or worthwhile to contact direct the person concerned and the direct personal investigation may not be used. In such case indirect or oral-examination can be conducted under which the interviewer has to cross-examine other person who is supposed to have knowledge about the problem under investigation and the information obtained is recorded. The personal interview can be of two types:

- **Structured and**
- **Unstructured**

Structured interview: Personal interview method of data collection is usually carried out in a structured and pre-planned way. Structural interview involves the use of a set of predetermined questions and has highly standardized technique of recording. It is not possible for interviewer to change even the sequences of the questions. The recording formats also are standardized.

Unstructured interview: Such interview is characterized by a flexibility of questions to questioning. It does not follow a system of pre-determined question and standardize techniques of recording information. The researcher is allowed much greater freedom to, if it is needed, supplementary questions or at times he may omit certain questions. Interviewer can change the sequences of question and he has also freedom in recording the response to include some aspects and exclude the other. Unstructured interview is much more difficult and time consuming than that of the structured one.

It also demands deep knowledge and greater skill on the part of interviewer. This approach is used in **exploratory research** whereas the **structured interview is used in descriptive research**. Because it is more economical, provide a safe basis for generalization and requiring relatively lesser skill on the part of the interviewer.

Merits of the personal interview method

- More information in greater depth can be obtained
- Interviewer by his own skill can overcome the resistance, in any, of the respondent
- There is greater flexibility and the opportunity to restructure questions specially in unstructured interview
- Personal information can be obtained easily

- Sample can be controlled more effectively and non is minimum under this approach
- The interviewer can control which person will answer the question
- Misinterpretation of the answer for questions is easily avoided
- It is possible to collect supplementary information about the respondent and environment, which is often of great value in interpreting result.

Weakness of the personal interview

- It is very expensive method especially when large and wide spread geographical sample is taken
- There is still the possibility of the bias of interviewer as well as that of the respondent. Because the supervision and control of interview is still problem
- Certain group of respondent (such as important official) may not be easily approachable under this method.
- This method is relatively more time consuming especially when the sample is large
- The presence of the interviewer may over stimulate the respondent, sometimes he even give imaginary information to make the interview interesting

8.2.2. Telephone Interview

This method collecting information involves contacting respondents on telephone itself..

Strength of Telephone Interview

- It is flexible compared to mailing method
- It is faster than other method
- It is relatively cheaper than personal interview
- Recall is easy and callback are simple and economical
- There is a higher rate of response
- Replies can be recorded without causing embarrassment to respondent
- Easy access to those respondent who are highly officials and cannot be contacted personally
- No field staff is required
- Wider distribution of sample is possible

Weakness of this method

- Little time is given to respondent for considering possible answer. Mostly the interview will not exceed five minutes at most
- Surveys are restricted to respondents having telephone
- Cost consideration may restrict extensive geographical coverage
- There is high possibility of biasedness from the side of the interviewer
- Since questions have to be sort and to the point, probes are difficult to handle

Prerequisites of interview

For successful implementation of the interview method:

- Interviewer should be carefully selected, trained and briefed. Moreover, interviewer should be honest, sincere, hardworking, and impartial and must possess the technical competence and necessary practical experience.
- Occasional field checks should be also made in advance so that appropriate action must be taken if some of the selected respondent refuse to cooperate or are not available when an interviewers calls up on.
- Interviewer has to try to crate friendly atmosphere of trust and confidence so that the respondent may feel at ease while talking and discussing with the interviewer
- Interviewer must ask question properly and completely. At the same times the interviewer must answer legitimate questions if any asked by the respondent.
- The interviewer should not show surprise or disapproval of a respondent's answer, instead he must keep the direction of interview in his own hand.

Basic principles of Interviewing

Interviewers should follow the following principles while conducting interview:

- Ask only one question at a time
- Repeat the question if necessary
- Listen carefully to the subjects answer
- Observe the subjects facial-expression, gesture and tone of the voice
- Allow the subject sufficient time to answer the question

8.3 Collection of data through Questionnaires

Questionnaire is a list of structured questions, which will be present, mailed or e-mailed to selected respondents to obtain reliable response from them. The objective is to find out what a selected group of respondents do, think or fell.

Questionnaire is used when the subject of study is very wide and direct observation is not possible. It is also used for such things, which cannot be known through direct observation (ideas, preference, motive, and so on).

In this approach a questionnaire present or sent to the respondent to answer the question and give back or sent back the questionnaire.

Types of Questionnaires

Questionnaires can be of the following type:

- Interview Questionnaires (Schedules)
- Mail Questionnaires (Self-administered questionnaires)
- Questionnaires through Internet (Through electronic media)

8.3.1. Mail Questionnaires

This method of data collection is very popular especially for large study. The questionnaires are sent by post to the person concerned with a request to answer the question and return them back.
Questionnaires are mailed to respondents who are expected to read and understand the question and write down the answer.

Advantage (strength) of this method

- Low cost even for larger sample size and widely spread geographically
- It is free from bias of the interviewer. Answers are in respondents' word.
- Respondents have adequate time to give well though answers
- Respondents, who are not approachable, can be reached conveniently (especially, in mail and e-mail).

Limitations

- Low rate of return
- It can be used only for literate respondents
- The control over the questionnaire may be lost once it is sent
- There is inbuilt inflexibility
- The slowest method of all

Guide to construct questions

The questionnaires should be very carefully constructed. In constructing questionnaires both questions and statements can be used to get information about the problem from respondents.

A) Forms of questions

Questions in a questionnaire can have either:

- Open ended questions or
- Closed ended question**.**

Open-end questions:

The respondent is asked to provide his own answer to the question. His answer is not in any ways limited. E.g., the respondent might be asked, "What do feel the most important issue facing your community"?

The problem associated with such form of questioning is that, it is not possible to get uniform answers and hence is difficult to process.

Closed ended questions:

The respondent is asked to select his answer from among a list provided by the researcher (yes, no, I don't know, etc). Closed ended questions are very popular in survey research since they provide a great uniformity response and because they are easy to process.

The major shortcoming of closed-ended questions on the researcher's structuring of response is that the checklist or the provided list of answers may not include all possible answers.

For example: In asking about "The most important issues facing your country?" the researcher may provide a checklist of issues, but in doing so he might overlook certain issues that respondent would have said were important.

To limit this shortcoming the following guidelines are helpful:

- The response categories provided should be exhaustive they should include all the possible response that might be expected.
- Often the researchers support this effort by adding a category leveled like "others (please specify)"
- The answer categories must be mutually exclusive; the respondent should not feel compelled to select more than one.

B) Make items clear

i. Make questionnaires item clear: Questionnaire items should be clear and unambiguous. Often the researcher become so deeply involved in the topic under examination that opinion and perspective are clear to him but may not be clear to his respondent. So question items should be precise so that the respondent knows exactly what the researcher want to an answer to be.

ii. Avoid double –barreled questions: Researcher often asks respondent for a single answer to combination of question.

E.g., “What do you think about the services like food and transportation provided by CBE office during the second phase of your CBTP program?"

Some respondent may want to answer as good to the transportation service and bad to the food service. As a general rule whenever the word “and” appears in a question statement, the researcher should check whether he is asking a double-barreled question.

iii. Respondent must be competent to answer

The researcher should ask himself whether the respondents are able to answer the desired questions. Question should be relevant to most of respondents. Short items are commonly considered as the best (long and complicated item should be avoided).

Avoid Negative items:

The researcher should avoid negative items as much as possible: The appearance of negation in a question crates condition to easy misinterpretation.

E.g., “Ethiopia should not recognize the new Government of Somalia”. Large portion of respondents will read over the word “not” and answer on that basis. Some will agree the statement when they are in favor of recognition, while others will disagree when they oppose it

C) General questionnaire format

The format of a questionnaire is as important as the nature and wording or the question asked. If the layout of the questionnaire is not appropriate it can confuse respondents and in the extreme, can lead respondents throwing the questionnaire away. Therefore, as a general rule, the questionnaire should be spread out and organized. The researcher should maximize the white space in his instrument. Putting more than one question in one line, leads to the probability of skipping the second question in case of some respondents.

i. Format for responses

A variety of methods are available for presenting response categories for respondents to check in answering a given question.

For closed-ended question: From experience boxes adequately spaced are the best. Most of the time closed-ended questions are followed by contingent. That is, the second question (contingent) imposed up on the response to the first one.

E.g., Have you ever….

[ ] Yes
[ ] No

If yes: How you…. (Open end question) or Have you …
[ ] Yes
[ ] No

The proper use of contingent questions can facilitate the respondents' task in answering questionnaires and can also improve the quality of the data produced.

For open-end question: Enough space should be provided so that the respondent could write in all his answers and thoughts. This will avoid ambiguity in interpreting the response.

ii. Ordering questions in questionnaires

The order in which questions are asked can affect response as well as the overall data collection activity. The appearance of one question can affect the answers given to the subsequent ones. Some researchers attempt to overcome this effect by randomizing the order of the questions. Randomized question rather appears to the respondent chaotic and may be confusing because he will be forced continuously change his attention from topic to another.

The better solution is sensitivity to the problem. The researcher should be in a position to estimate what effect it will have on the next question.

iii. Opening question:

Opening question is also very important. The researcher should avoid the following type of question as opening question in a questionnaire.

- Question that put too great strain on the memory or intellect of the respondent
- Question of personal character
- Question related to personal wealth etc.

The best way to determine the question-sequence is with the help of a pilot survey, which likely produces good rapport (harmony) with most respondents.

iv. Questionnaire format

Questionnaires of different research can have different formats. Commonly used formats of questionnaires contains the following parts

Instruction: Every questionnaire, whether it is self-administered by the respondent or administered by an interviewer, should contain clear instruction and introductory comment. If a questionnaire has different parts it needs to have general instruction for the whole questionnaire and specific instruction for each parts of a questionnaire. Here the researcher will instruct (tell) the respondent to indicate their answer by putting a check mark in the box or his appropriate answer if needed.

General instruction: Every self-administered questionnaire should begin with basic instruction. It is useful to begin by telling the respondent that he is to indicate his answer to some questions by putting a check mark or an X in the box or his appropriate answer when it called for.

Specific instruction: Some question may require special instruction to facilitate proper answering. In closed end question it is often the case that more than one answer will apply for respondent. If the researcher wants a single answer he should make clear in the question. This is done mostly when the main question can be followed by a parenthetical note "please check the one best answer".

Introduction: If the questionnaire is arranged into content subsections then it is useful to introduce each section with short statement concerning its content and purpose.

v. Mail distribution and return

The basic method for data collection through the mail has been a transmission of a questionnaires accompanied by a letter of explanation and a return envelope. The respondents then complete the questionnaire and return it to the research office through the mail, using the envelope provided for that purpose.

Alternative method is that in some cases it is possible to further facilitate this process through the use of a self-mailing questionnaire. The questionnaires are constructed in such a way that the research office's return address and postage are printed on the questionnaire itself. Up on completion, then it can be dropped in the mail without requiring an envelope.

However, the post office has special requirement regarding the form of materials that can be mailed; thus, researcher should plan this approach properly and count with it. These methods simplify the assembly of mailing pieces since it is unnecessary to include a return envelope and the respondent cannot lose the return envelope. It has a certain "TOY VALUE". To some extent the respondent may want to complete the questionnaire so that he can then play with a cover.

vi. Monitoring the return

As questionnaires are returned to the researcher, he should undertake a careful recording of methodological data. He should label a return rate graph. The day on which questionnaires were mailed should be labeled day one on the graph. It is usually best to complete two graphs. One should show the number returned each day raising then dropping. Another should report cumulative number or percentage. This will show the picture of his successful data collection.

vii. Follow-up-mailing

Following up mailings is strongly recommended, as it is an effective approach for increasing return rate in mail survey. Follow up will be done by sending another mail to the respondents. In practice, three mailing (one original and two follow-ups) seems the most efficient. The timing of follow-up mailings is also important- two or three weeks are a reasonable gap between mailings.

Follow-up mailings may be administered in a number of ways

- Respondents are simple sent a letter of additional encouragement to participant
- Better method is to send a new copy of the survey questionnaire with the follow-up letter to all respondents

If the individuals in the survey sample are not identified on the questionnaires returned, in such case the researcher should send his follow-up mailings to all initial members of the sample, thanking those who have already participated (returned) and encouraging those who have not yet do so.

viii. Acceptance response rate

The percentage return rate that should be achieved in a mail survey is:

- A response rate 50% is adequate for analysis and reporting
- A return rate at least 60% is good and a response rate of 70% or more is very good.

But we should bear in mind that the body of inferential statistics used in connection with survey analysis assumed that all members of the initial sample complete and return their questionnaires.

Interview Questionnaires (Schedule)

Schedules are particular types of questionnaire. These methods are very much like collection of data through questionnaires, with little difference, which lies in the fact that schedules are being filled in by enumerators (interviewers) who are specially appointed for the purpose.

Enumerator along with schedule (questionnaires), goes to the respondent, put to them the questions from the Performa in the order of the questions are listed and record. The replies in the space meant for the same in the Performa (questionnaires).

Here we consider both schedule and interview questionnaires are similar and the same. The questionnaires are either delivered by hand to be answered by respondents or the trained interviewer will read the question to respondent and record the answer given. But mostly the interviewer read the question and records the answers given by respondent.

Importance of Interviewer

There are a number of advantages in having questionnaires administered by an interviewer rather than by the respondent himself.

- Interview survey attains higher response rate than mail survey. A properly designed and executed interview survey ought to achieve a return rate of at least 80-85%.
- The presence of interviewer generally decrease the number of "don't knows' and "no answers".
- The interviewer can be instructed to probe for answer, "if you had to pick one of the answer, which do you think would come closest to your feelings?"
- Interviewer can also provide a guard against confusing questionnaires item. (Clarification must be strictly controlled).
- The interviewer can observe as well as ask question.

General Rule for Interviewing

The manner in which the interview would be conducted will vary by survey population and will be affected by the nature of the survey. Nevertheless, it is possible to provide some general guidelines that would apply to most, if not all, interviewing situations.

i. Appearance and Demeanor (behavior or conduct): As a general rule, the interviewer should dress in a fashion fairly similar to that of the people he will be interviewing. Richly dressed interviewer will probably have difficulty in getting good cooperation from poor respondent. And poorly dressed interviewer will have similar difficulties with richer respondent.

ii. Familiarity with questionnaires: If the interviewer is not familiar with the questionnaires, the study suffers and unfair burden is placed on respondent. And the interview would take more time than necessary.

The interviewer must study carefully question by question, and he must practice reading it allowed.
He must be able to read the questionnaires item to respondent without error.
The interviewer must be familiar with the specification prepared in connection with the questionnaires

iii. Record responses exactly: No attempt should be made to summarize, rephrase or correct bad grammar. The response should be written down exactly as given.

iv. Probing for response: These are required to open ended questions responses.
Sometimes the respondent will respond to a question with an inappropriate answer. In this case the interviewer may use appropriate verbal probes like, "how is that" "to what way" or the better probes (interrogation) are that, "anything else". But such probes should be neutral.

v. Interviewer should be trained: Even if there is fortunate enough to organize an interviewing team comprised of intelligent, experienced interviewer, careful interviewer training is essential. Every survey and every questionnaire differ from one another; interviewers must be retrained for each new survey. The amount of time required for training is depending up on the scope and the nature of the survey.
E.g., normal household survey may require about two weeks, one week a classroom instruction and practice, and another week of practice in the field.

The interview training touches the following points:

General description: The training begins with the general comments about the nature of the survey and its ultimate purpose. If the interviewers understand why the survey is being conducted and can see that it is an important undertaking, they will be more diligent and careful in their work. The general description of the training should include:

- The sponsor of the survey
- The primary purpose of the study
- How the sample of the respondent was selected
- How the questionnaires was designed
- How the data will be processed and analyzed
- If they can understand how they fit in the overall process.

These will probably help them to feel more apart of the research team and will respond accordingly.

Studying the questionnaires and specifications: Interviewers and the supervisors or principal researcher should subsequently go through the entire questionnaire step by step.

- The purpose of item should be explained
- All possible ambiguities should be discussed and resolved
- Much of the discussion during this activity will take the form of "what do I do if the respondent says…"
- There will be examination, which also involves an examination of specifications.

Practice the interviews in class (pre-test): Once the questionnaires and specifications have been studied in detail, the session should be organized around series of practices. Two or three interviews should be conducted in front of the whole class. The best beginning will be for the principal researcher to interview the supervisor. This interview should serve as a model for the interviewers. The class should be encouraged to discuss and ask questions.

Practice interviewers in the field (Pilot survey): This part of the training should be exactly like the real interview. Assignments of respondents' and/ or addresses should be made just as will be done in final survey. The interviewer would be given exactly the materials they will use in the final survey in the field. (Respondents should not be told that they have been selected for training purpose). About 5 interviews will be enough as training. Upon compilation interview practice, the interviewers bring back the questionnaires to the supervisor and the supervisor go through completed questionnaires with him to locate and discuss any problem and to answer any new question the interviewer may have.

Difference between questionnaires and schedules

Mail Questionnaires	Schedules
Generally sent through mail to respondents	They are filled out by a research worker or enumerators
Data collection is relatively cheap	It is more expensive, since money has to be spent in appointing, train the enumerators
Non response is usually high	Non-response is generally low
It is not always clear who replies	The identity of the respondent is known
It is very slow method	Information is collected well in time
Personal contact is impossible	Direct personal contact is established
Useful only for literate respondent	Information can be gathered even form illiterate respondent
Wider and more representative sample distribution is possible	It is difficult to send enumerator to wider area
The success of this method depend up on the quality of the questionnaires	Success of this method depends on the honesty and competence of enumerator
No observation	Observation method can also be used

Focus group discussion (FGD)

Sometimes it is preferable to collect information from groups of people rather than from a series of individuals. Focus groups can be useful to obtain certain types of information or when circumstances would make it difficult to collect information using other methods to data collection.

Characteristics and uses of focus group discussions

A focus group discussion (FGD) is a group discussion of 6-12 persons guided by a facilitator, during which group members talk freely and spontaneously about a certain topic.

The purpose of an FGD is to obtain in-depth information on concepts, perceptions, and ideas of the group. It aims to be more than a question-answer interaction.

FGD techniques can be used to:

a) Develop relevant research hypotheses by exploring in greater depth the problem to be investigated and its possible causes.
b) Formulate appropriate questions for more structured, larger scale surveys.
c) Supplement information on community knowledge, beliefs, attitudes, and behaviour already available but incomplete or unclear.
d) FGDs are not used to test hypotheses or to produce research findings that can be generalized.

Conducting a focus group discussion

Recruitment of participants: Participants should be roughly of the same socioeconomic group or have a similar background in relation to the issue under consideration. The age and sex composition of the group should facilitate free discussion.

If we need to obtain information on a topic from several different categories of informants who are likely to discuss the issue from different perspectives, we should organize a focus group for each category. For example, a group for men and a group for women.

Physical arrangements: Communication and interaction during the FGD should be encouraged in every possible way. Arrange the chairs in a circle. Make sure the area will be quiet, adequately lighted, etc., and that there will be no disturbances.

Preparation of a discussion guide: There should be a written list of topics to be covered. It can be formulated as a series of open-ended questions.

During the discussion: One of the members of the research team should act as a "facilitator" for the focus group. One should serve as "recorder."

Functions of the facilitator:

- Introduce the session;
- Encourage discussion;
- Encourage involvement;

- Listen carefully and move the discussion from topic to topic. Subtly control the time allocated to various topics so as to maintain interest;
- Take time at the end of the meeting to summarize, check for agreement and thank the participants.

In general, the facilitator should not act as an expert on the topic. His or her being there is to stimulate and support discussion.

Report writing in focus group discussions: Start with a description of the selection and composition of the groups of participants and a commentary on the group process, so the reader can assess the validity of the reported findings.

Present your findings, following your list of topics and guided by the objective(s) of your FGD. Include questions whenever possible, particularly for key statements.

The method of data collection chosen for a study should be appropriate for the type of information required. Whether the required information is quantitative or qualitative in nature is the major consideration. It would be time wasting to use unstructured interviews for essentially quantitative studies where information could be more efficiently collected through structured interviews or questionnaires. Conversely, self-completed questionnaires are generally unsuited to qualitative research: even when there is space for comments or for respondents to express ideas the space is limited and requires respondents to have skills in articulation and literacy.

CHAPTER NINE

METHOD OF SECONDARY DATA COLLECTION

Secondary information is information, which has already been collected by someone and which, have already been passed through statistical process. The researcher does not obtain them directly rather he gathered them from published and unpublished material.

Why a researchers use data from secondary sources? In most cases researchers use secondary data for different reasons like**:**

- **Secondary data may solve problem**: If adequate data are available from secondary sources, primary data collection will not be necessary.
- **Search costs are substantially lower than primary sources**. It is cheap and less time consuming than primary sources. A comprehensive search of secondary sources can almost always be made in a fraction of the time and cost required for collection of primary data

It has also important supplementary use, these includes:

- It helps to define the problem and formulate hypothesis about its solution. The assembly of available secondary data (information) always provides a better understanding of the problem and it may suggest reformulation and solution not considered previously.
- It will help to plan the collection of primary data. Examination of the methods and techniques employed by other investigators in similar studies may be useful in planning the present one.
- It will help to define the population and select the sample in primary data collection.

However, the researcher must be careful when using secondary data, particularly as the only sources of data. Secondary data to be useful, it must be:

- Available
- Relevant to the information needed
- Accurate and sufficient to meet data requirement.

Before using secondary data, we must see that they possess the following characters.

1. **Reliability of the data**

The reliability can be tested by finding answers to the following questions about the said data:

- Who collect the data? (How is the reputation of the collector?)
- What were the sources of the data?
- Were they collected using proper method?
- At what time were they collected?
- Was there any bias of the collector?
- What level of accuracy was desired?
- Was it achieved?

2. Suitability

The data that are suitable for one inquiry may not necessary be found suitable in another inquiry. The researcher must very carefully scrutinize the definition of various terms and units of collection used at the time of collecting the data from the primary sources originally. The object, scope and nature of the original inquiry must be studied. If the researcher finds difference in these, the data will remain unsuitable for the present inquiry and should not be used.

3. Adequacy

If the area and scope of the study is narrower than the area of present study the data are considered as inadequate. Because of the fact that information will be missed and the researcher needs additional sources to make it complete and usable. .

Secondary data may be obtained either from:

- Internal (within the company or organization)
- External sources (outside sources)

Internal secondary data: All companies or organizations or any other organs keep record of the every course of conducting business or any other activities.

- Orders received are filled
- Cost are recorded
- Sales' people reports are submitted. Such and the like data are some of the many sources of information collected by the company for other purpose and are useful to the researcher.

External sources of secondary data: The major sources of external information are:

- Government (federal, state, local)
- Trade association and trade press
- Periodicals
- Institution (research, academic)
- Commercial services and the like

The secondary sources of information can be classified into

i. Personal Document
ii. Public document

9.1. Personal document

These include the entire published and unpublished information document by the individuals for different purpose:

- Personal documents are not written in scientific manner (style) nor do they have an objective basis.

They generally represent some ideas, values and feeling etc.

In spite of being subjective unscientific they have been very much useful in social research. Personal documents have been classified in to four types

1. Biography / Autobiography

Some great political, business leaders, social reformers and eminent persons write their own autobiographies or some other people (biographer) write their biography. Such persons provide useful information concerning, social, economic, political, religious and cultural conditions and incidents of their time.

Even, in some cases it is possible to get some information, which could not be known from any other sources.

Autobiographies are life histories, life experience and incidents of prominent individuals written by them. Biographies are life history, experience and events of some prominent person written by some biographer

Autobiography/ biography can be written for different purpose. It can be written in order to preserve specific feelings, incidents and events of writer's life. Such autobiography has objective basis and are useful source of information, if it is available indeed. Autobiography can also be written in order to publish and get financial benefit and popularity. Such autobiographies are less reliable as they are full of exaggeration and are full of deliberate distortion of facts.

Diaries:

Many educated people have a habit of writing diaries concerning their social relationship and life incidents. Most of the dairy writer has no intention to publish them. Some people daily write diaries to include program of the day.

Diaries are written with different intentions. Some write diaries to remember important incidents of their life. Some on the other hand write diaries to note things, which they cannot tell to anyone. They may write it to release their tension. Diary writing is a confidential and private performance. Therefore, if they are available they can be considered as a reliable.

Letters

Letters are often used by researchers as evidence especially in studies like, history and sociology and psychology. Most people write a number of letters during the course of their lives. Letters are the medium of expressions of feelings likes and dislikes attitudes, desires, emotion, ambitions and important incidents of life. Letters are in general, personal and very reliable. Thus, they constitute one of the most reliable sources of information about the inter relationship, such as, friendship, love, marital affairs, family tension and divorce and the like.

Limitations

- Difficult to collect private letters
- The letters do not provide detailed and complete description of incidents
- If letters of only one person is secured, they hardly provide scientific data since no comparable information is available.

Memories

Some people are interested in writing down memories for their travels, participation in different activities. Such memories provide useful information in social research.

Limitations of personal documents

- Difficult in collection.
- They are rarely recorded and more seldom preserved
- Problem associated with the reliability of data: There are almost no criteria to judge their validity since they are written from subjective view point.
- It is not possible to arrive at some definite conclusion say about a social problem on the basis of personal document.

9.2. Public and Official document

In many research studies these sources of information are commonly and widely used. Public documents are information gathered from some governmental or non-governmental institutions.

Public document can be either unpublished or published documents. Unpublished documents are like reports of some big companies, confidential records of government departments and non-governmental organization.

Published document are those published documents in the general interest of the public. Such documents may be prepared by government or any other organs.

Some common public documents are of the following types

Records: These are the most important sources of secondary data. Most government and non-government institution preserves many types of records consisting of important information. For instant each police department keeps record of criminals. Company records like no employees, wage paid, growth rate sale etc.

Census report and statistics: A very important source of data collection is census report and the annual digest of statistics and statistical report of various state departments and national bodies. These reports are reported by experts and, therefore, their data are highly reliable. The data collected in these reports are arranged according to the administrative objective:

- Health (concerning birth and death rate, number of hospitals, number of beds, number of doctors and the like).
- Economic and related data: Annual production, average income, foreign trade, wage, hours of work, price level (inflation rate), interest rate, exchange rate etc.)
- Education (number of schools, students, teachers, number of graduates and the like)

The Importance of census data can be summarized as:

Political importance: It provides population statistics about the whole country and this information help government in formulating various plan and policies.
Economic importance: Economic plan of the country is based on population statistics. It provides data concerning income, expenditure and the like.
Sociological importance: It also shows social condition, social evils, customs and tradition etc.
Commercial importance: Commercial plans (business plans) require different types of information and statistical data. This is very much supplied by census report. Based on this information they will estimate the consumption (demand) and supply of different commodities.

Journals and magazines: These are common and widely used sources of information. Information obtained from these sources is very much reliable.

Newspapers: Published news (discussion on contemporary issues, reports of meetings and conferences) is very important sources. Economic news paper usually report data like:

- Daily stock price
- Exchange rate
- Interest rate
- Daily commodity price
- Price indices (report on quarterly basis)

Other documents: Under this category we can have information sources like, television, film, radio and public speech. The investigator, however, should be capable of sorting out the reliable material and distinguish it from unreliable one**.**

Generally, information through secondary data is relatively easy to obtain but difficult to use them in social science. Thus, the information should be carefully judged before using it.
Judgment of such information involves:

- Verification of reliability of facts before using them in any study.
- Verification of honesty, ability, methods and tools of the investigator himself.
- Verification of the method of data collection
- Verification of representativeness of sample used in the primary data collection
- The organization for collection of data should be scrutinized as well

After all this preliminary arrangement, the investigator should select some facts and verify them so that he may have some idea about the reliability of total secondary data. Beside reliability, the adequacy of facts should be judged before utilizing them in social research.

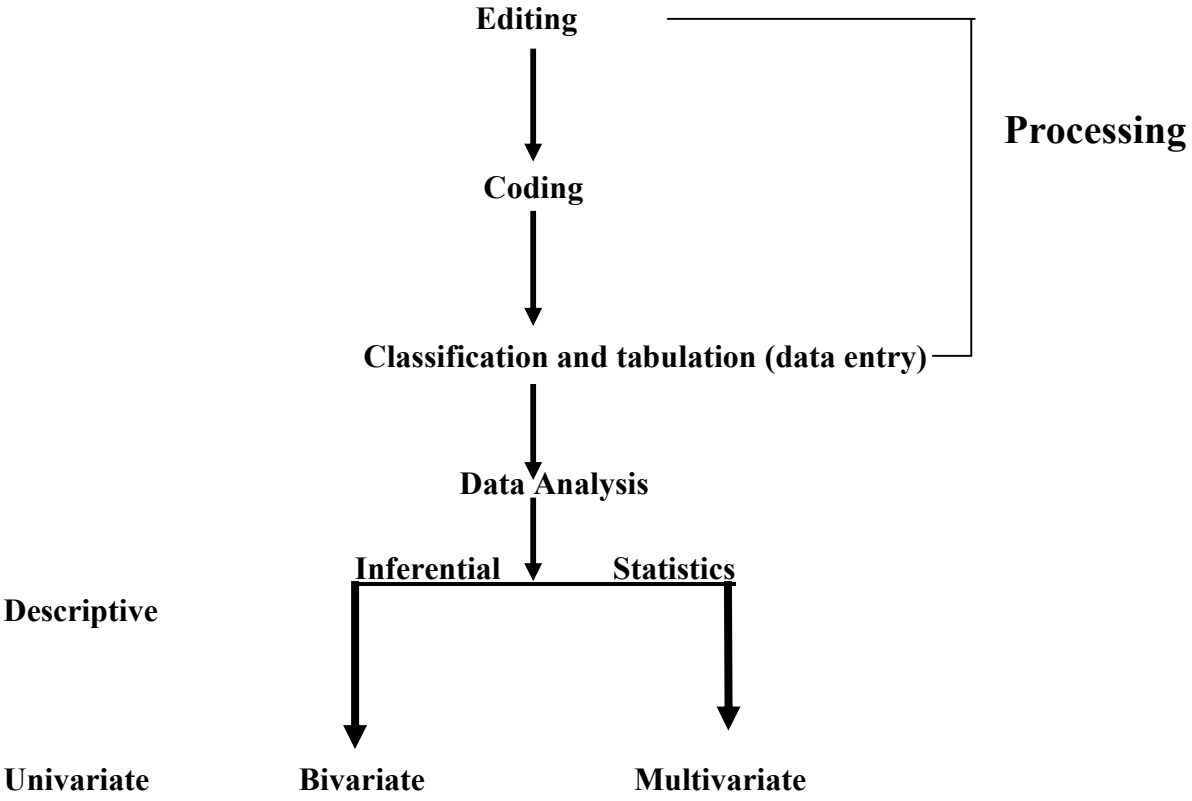
Adequacy is evaluated by verifying whatever the collected secondary data have an objective identical with the study. The unit of available data should be verified so that adequacy of facts may be observed.

CHAPTER TEN

OVERVIEW OF DATA PROCESSING AND ANALYSIS

The goal of any research is to provide information out of row data. The row data after collection has to be processed and analyzed in line with the outline (plan) laid down for the purpose at the time of developing the research plan. Response on measurement instruments (words, check mark etc.) conveys little information as such. The compiled data must be classified, processed, analyzed and interpreted carefully before their complete meanings and implications can be understood.

Generally stages in data processing and analysis can be summarized as:



There are two stages of data analysis:

- Data processing and
- Data analysis.

Some authors do like to make difference between processing and analysis. However we see them separately these terms briefly.

10.1. Data processing

Data possessing implies editing, coding, classification and tabulation of collected data so that they are amendable to analysis.

Editing: Is a process of examining the collected raw data to detect errors and omission (extreme values) and to correct those when possible. It involves a careful scrutiny of completed questionnaires or schedules. It is done to assure that the data are:

- Accurate;
- Consistent with other data gathered;
- Uniformly entered;
- As complete as possible;
- And has been well organized to facilitate coding and tabulation.

Editing can be either field editing or central editing.

Field editing: Consist of reviewing of the reporting forms by the investigator for completing what has been written in abbreviation and/ or in illegible form at a time of recording the respondents' response This sort of editing should be done as soon as possible after the interview or observation.

Central editing: It will take place at the research office. Its objective is to correct errors such as entry in the wrong place, entry recorded in month.

Coding: Refers to the process of assigning numerical or other symbols to answers so that responses can be put into a limited number of categories or classes. Such classes should be appropriate to the research problem under consideration.

There must be a class of every data items. They must be mutually exclusive (a specific answer can be placed in one and only one cell in a given category set).

Coding is necessary for efficient analysis and through it several replies may be reduced to a small number of classes, which contain the critical information required for analysis.

E.g., Closed end question
1 [ ] Yes
2 [ ] No
Or

Less than 200 [ ] 001
201- 699 [ ] 002
.
.
.
1500 and more [ ] 006

Coding is used when the researcher uses computer to analyze the data otherwise it can be avoided.

Classification: Most research studies result in a large volume of raw data, which must be reduced into homogeneous group. Which means to classify the raw data or arranging data in-groups or classes on the basis of common characteristics?

Data Classification implies the processes of arranging data in groups or classes on the basis of common characteristics. Data having common characteristics placed in one class and in this way the entire data get divided into a number of groups or classes.

Classification according to attributes: Data are classified on the basis of common characteristics, which can either be descriptive (such as literacy, sex, honesty, etc) or numerical (such as, weight, age height, income, expenditure, etc.). Descriptive characteristics refer to qualitative phenomenon, which cannot be measured quantitatively: only their presence or absence in an individual item can be noticed. Data obtained this way on the basis of certain attributes are known as statistics of attributes and their classification is said to be classification according to attributes.

Classification according to class interval: Unlike descriptive characteristics the numerical characteristics refer to quantitative phenomenon, which can be measured through some statistical unit. Data relating to income, production, age, weighted, come under category. Such data are known as statistics of variables and are classified on the basis of class interval. For example, individuals whose incomes, say, are within 1001-1500 Birr can form one group, those whose incomes within 500-1000 Birr form another group and so on. In this way the entire data may be divided into a number of groups or classes or what are usually called, class interval. Each class-interval, thus, has an upper as well as lower limit, which is known as class limit. The difference between the two-class limits is known as class magnitude. The number of items that fall in a given class is known as the frequency of the given class. All the classes with their respective frequency are taken together and put in the form of table are describing as group frequency distribution or simply frequency distribution. Classification according to class intervals usually involves the following problems.

How many classes should be there? What should be their class size (magnitude)? The answer is left to the skill and experience of the researcher. However, the objective should be to display the data in such a way as to make it meaningful to the analyst. Concerning the class size, each group is expected to

have equal size. Multiples of 2.5 and 10 are generally preferred while determining the class size. Some statistician adopts the following formula.
(i = R/ (1+3.3 log/N)

Where, I = class size
R = Range (i.e, difference between the value of the largest item and smallest item among the items to be grouped.
N = Number of item to grouped

Some problems in processing

Don't know (DK) Responses: During data processing, the researcher often comes across some responses that are difficult to handle. Don't know (DK) is one example of such responses. When the DK response group is small, it is of little significance. But when it is relatively big, it becomes a matter of major concern.
How the DK responses are to be dealt with by researcher?

Prevention is the best!

- The best way is to design better types of question. Good rapport (understanding) of interviews with respondents will result in minimizing DK response.
- But what about the DK responses that have already taken place? One way to tackle this issue is to estimate the allocation of DK answers from other data in the questionnaire
- The other way is to keep DK responses as a separate replay category if DK response happens to be legitimate, otherwise we should let the reader make his own decision.

10.2. Analysis

Data analysis is further transformation of the processed data to look for patterns and relations among data groups.

By analysis we mean the computation of certain indices or measures along with searching for patterns or relationship that exist among the data groups. Analysis particularly in case of survey or experimental data involves estimating the values of unknown parameters of the population and testing of hypothesis for drawing inferences.

Analysis can be categorized as

- Descriptive Analysis
- Inferential (Statistical) Analysis

Descriptive analysis: Descriptive analysis is largely the study of distribution of one variable. Analysis begins for most projects with some form of descriptive analysis to reduce the data into a summary format. Descriptive analysis refers to the transformation of raw data into a form that will make them easy to understand and interpret.

Descriptive response or observation is typically the first form of analysis. The calculation of averages, frequency distribution, and percentage distribution is the most common form of summarizing data.

The most common forms of describing the processed data are:

- Tabulation
- Percentage
- Measurements of central tendency
- Measurements of dispersion
- Measurement of asymmetry
- Data transformation and index number

Tabulation: Refers to the orderly arrangement of data in a table or other summary format. It presents responses or the observations on a question-by-question or item-by-item basis and provides the most basic form of information. It tells the researcher how frequently each response occurs. This starting point of analysis requires the counting of responses or observations for each of the categories. E.g., Frequency tables,

Need for tabulation

- It conserves space and reduces explanatory and descriptive statement to a minimum;
- It facilitate the process of comparison;
- It facilitate the summation of items and the detection of errors and omission;
- It provide basis for various statistical computation.

Percentage: Whether the data are tabulated by computer or by hand, it is useful to have percentages and cumulative percentage. Table containing percentage and frequency distribution is easier to interpret. Percentages are useful for comparing the trend over time or among categories.

Measure of central tendency: Describing the central tendency of the distribution with the mean, median or mode is another basic form of descriptive analysis. These measures are most useful when the purpose is to identify typical values of a variable or the most common characteristics of a group. Measure of central tendency is also known as statistical average. Mean, median and mode are most popular averages.

- **Mean** (arithmetic mean) is the common measure of central tendency

- **Mode** is not commonly used but in such study like estimating the popular size of shoes it can be used
- **Median** is commonly used in estimating the average of qualitative phenomenon like estimating intelligence.

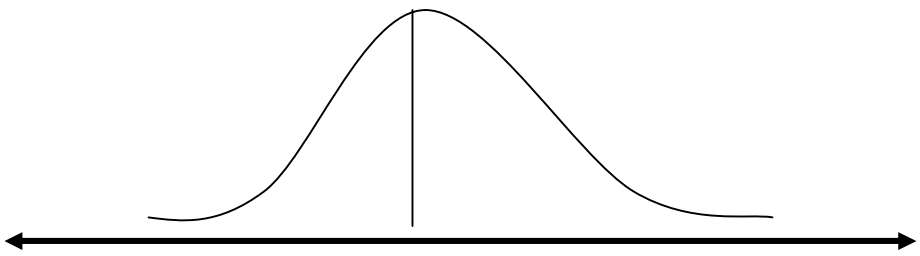
Measurement of dispersion: Is a measurement how the value of an item scattered around the true value of the average.

Average value fails to give any idea about the dispersion of the values of an item or a variable around the true value of the average.

After identifying the typical value of a variable the researcher can measure how the value of an item is scattered around the true value of the mean. It is a measurement of how far is the value of the variable from the average value. It measures the variation of the value of an item. Important measures of dispersion are:

- **Range:** Measures the difference between the maximum and the minimum value of the observed variable
- **Mean deviation:** It is the average dispersion of an observation around the mean value. $\Sigma(Xi - X)/n$
- **Variance:** It is mean square deviation. It measures the sample variability.

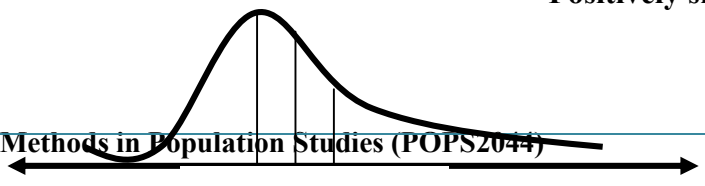
Measurement of asymmetry (skew-ness): When the distribution of items is happen to be perfectly symmetrical, we then have a normal curve and the relating distribution is normal distribution. Such curve is perfectly bell shaped curve in which case the value of **Mean = Median = Mode**. Under this condition the skew-ness is altogether absent. If the curve is distorted (whether on the right or the left side), we have asymmetric distribution this indicates that there is a skew ness.



Z=M=X

If the curve is skewed on the right side we call it positive skew ness

Positively skewed data



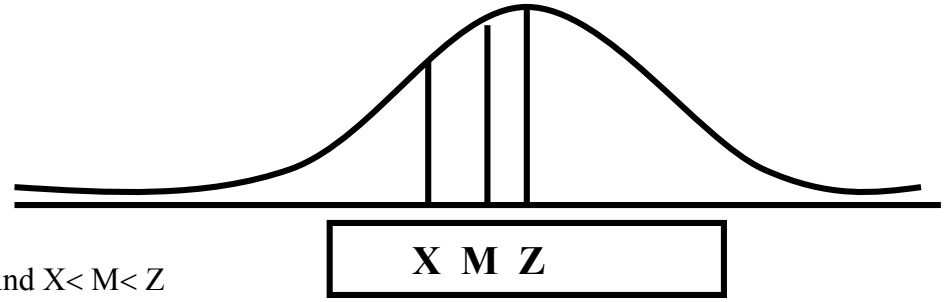
X M Z

X is mean, M and Z is mode

In such case Z < M < X

But when the curve is skewed toward left, we call it negative skew ness.

Negatively skewed data



And X< M< Z

Skew-ness is, thus a measurement of asymmetry and shows the manner in which the items are clustered around the average. In a symmetric (normal distribution) the items show a perfect balance on either side of the mode, but in a skewed distribution the balance is skewed one side or distorted. The amount by which the balance exceeds on one side measures the skew-ness.

Knowledge about the shape of the distribution is crucial to the use of statistical measure in research analysis. Since most method make specific assumption about the nature of distribution.

10.2.2. Inferential Analysis

Most researcher wishes to go beyond the simple tabulation of frequency distribution and calculation of averages and / or dispersion. They frequently conduct and seek to determine the relationship between variables and test statistical significance. When the population is consisting of more than one variable it is possible to measure the relationship between them.

If we have data on two variables we said to have a bivariate variable, if the data is more than two variables then the population is known as multivariate population. If for every measure of a variable, X, we have corresponding value of variable, Y, the resulting pairs of value are called a bivariate population.

In case of bivariate or multivariate population, we often wish to know the relationship between the two or more variables from the data obtained.

E.g., we may like to know, “Whether the number of hours students devotes for study is somehow related to their family income, to age, to sex, or to similar other factors.

There are several methods of determining the relationship between variables.
Two questions should be answered to determine the relationship between variables.

1. Is there exist association or correlation between the two or more variables? If yes, then up to what degree?

This will be answered by the use of correlation technique. Correlation technique can be different In case of bivariate population correlation can be found using Cross tabulation.

- Karl Pearson's coefficient of correlation: It is simple correlation and commonly used
- Charles Spearman's coefficient of correlation

In case of multivariate population correlation can be studied through:

- Coefficient of multiple correlation
- Coefficient of partial correlation

2. Is there any cause and effect (causal relationship) between two variables or between one variable on one side and two or more variables on the other side?

This question can be answered by the use of regression analysis. In regression analysis the researcher tries to estimate or predict the average value of one variable on the basis of the value of other variable. For instance a researcher estimates the average value score on statistics knowing a student's score on a mathematics examination.

There are different techniques of regression.

In case of bivariate population cause and effect relationship can be studied through simple regression.
In case of multivariate population: Causal relationship can be studied through multiple regression analysis.

CHAPTER ELEVEN

INTERPRETATION AND REPORTING THE RESEARCH RESULT

After collecting and analyzing the data, the researcher has to accomplish the task of drawing inferences followed by the 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.

It is through interpretation that the researcher can expose relations and processes that underline his findings. If hypotheses are tested and upheld (confirmed), the researcher may arrive at generalization. But in case the researcher had no hypothesis to start with, he would try to explain his findings on the basis of some theory.

All the analytical information and consequential inferences may well be communicated, preferably through research report, to the consumers of research results who may be either an individuals or groups or some public or private organization.

11.1. Meanings and Technique of Interpretation

Interpretation refers to the task of drawing inferences from the collected facts after analytical or experimental study. The task of interpretation has two parts or has two major aspects:

- The effort to establish continuity in research through linking the results of a given study with those of others.
- The establishment of explanatory concept.

In one sense, interpretation is concerned with relationships within the collected data, partially overlapping analysis. Interpretation also extends beyond the data of the study to include the results of other research, theory hypothesis.

Why interpretation?

Interpretation is considered as a basic component of research process because of the following reasons:

- It is through interpretation that the researcher can well understand the abstract principle that works beneath (beyond) his findings.
- It will lead to the establishment of explanatory concepts that can serve as a guide for further research study.
- It opens new avenues of intellectual adventure and stimulates the quest for more knowledge.

Researcher can only be better appreciated only through interpretation why his findings are what they are and can make others to understand the real significance of his research findings. The interpretation of exploratory research often results into hypothesis for experimental research.

Technique of interpretation

The task of interpretation is not an easy job. 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, at times, seek the 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 following suggested steps could be helpful. Researcher must give reasonable explanation of the relation, which he has found and he 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 diversified research findings.

Extraneous information, 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.

It is advisable, before embarking upon final interpretation, to consult someone having insight into the study and who is frank and honest and will not hesitate to point out omissions and errors in logical argumentation. Such a consultation will result in correct interpretation and, thus, enhance the utility of research result.

Researcher must accomplish the task of interpretation only after considering all relevant factors affecting the problem to avoid false generalization. He must not be in hurry while interpreting results, for quite often the conclusion, which appear to be all right at the beginning, may not at all be accurate.

Precaution in interpretation

Researcher must pay attention to the following points for correct interpretation.

- At the outset, researcher must invariably satisfy himself that: the data are appropriate, trust worthy and adequate for drawing inferences. The data reflect good homogeneity (no extreme) and proper analysis has been done through statistical or any other methods.
- The researcher must remain cautious about the errors that can possibly arise in the process of interpreting results. Error can arise due to:
- False generalization and/or due to wrong interpretation of statistical measures, such as:
  - ✓ The application of findings beyond the rang of observation
  - ✓ Identification of correlation with causation and the like

- ✓ He should be well equipped with and must know the correct use of statistical measures for drawing inferences concerning his study.
- ✓ Broad generalization must be avoided, because the coverage restricted to a particular time, a particular area and particular condition. Such restriction, if any, must invariably be specified and the result must be framed within their limit.

The researcher must remember that there should be constant interaction between initial hypothesis and, empirical observation and theoretical conceptions. It is exactly in this area of interaction between theoretical orientation and empirical observation that opportunity for originality and creativity lies.

11.2. Reporting the research result

Writhing report is the last step in a research study and requires a set of skills somewhat different from those called for in research of the earlier stages of research. This task should be accomplished by the researcher with at most care. He may also seek the assistance and guidance of experts for the purpose. The research task remains incomplete till the report has been presented and/or written.

Even the most brilliant hypothesis, well-designed and conducted research study, and the most striking generalization and findings are of little importance unless they are effectively communicated to others. The purpose of research is not well served unless the findings are made known to others.

Layout of research report

Layout of the report means as to what the research report should contain and look like. A comprehensive layout of the research report should comprise:

- ✓ Preliminary pages
- ✓ The main text
- ✓ The end matter

Preliminary pages

In this part the report should carry

- ✓ Title
- ✓ Acknowledgment (this can be in the form of preface and forward, in larger study)
- ✓ Table of content
- ✓ List of tables (figures) [1]

[1] Preliminary pages are commonly numbered by Roman numbers

Main text

The main text provides the complete outline of the research report along with all details. Title of the research is repeated at the top followed by abstract and then follows the other details on pages numbered consecutively beginning with second page. Each main section of the report should begin on a new page.

Main text can have the following sections

- ✓ Introduction
- ✓ Background of the study
- ✓ Rationale
- ✓ Objectives
- ✓ Literature Review
- ✓ Material and Methodology
- ✓ Data (or material)
- ✓ Methodology used,
- ✓ Limitation of the study
- ✓ Results and discussion (in some cases, Empirical Analysis)
- ✓ Summary, Conclusion and Recommendation

Since, some of the main sections of the report have been explained in some detail in chapter four section two, here attempts were made to explain only selected parts of the report, which need special attentions**.**

Introduction: the major subdivisions of this part are generally the ones shown in the proposal: statement of the problem, significance of the study, and the organization of the study. This part of the study should be lucid complete and concise. It has to be written in a lively and stimulating manner in order to arouse the interest of the reader to go through the report.

Literature Review: this is a section for documentation with insight theoretical and empirical investigation that had been carried out as related to the study at hand

Material and Methodology or Data and Methodology: this part includes detailed description of the manner in which decision have 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, justification of the selection of the particular method of data collection. Definition of the population, the sampling techniques used to select sample elements with its full justification, the size of the sample and the rational for the size, statistical tools used to analyze the data the rational for using them will be dealt in detail in this section.

Limitations: No report is perfect, so it is important to indicate its implications. If there were problems with non-response errors, or sampling procedures, they should be discussed. The discussion of limitation should avoid overemphasizing the weakness, though its aim should be to provide a realistic basis for assessing the results.

Result and Discussion: A detailed presentation of the findings of the study (the results of the data analysis) with supporting data in the form of tables and charts together with a validation of results. In other words in this section the data is presented in tables and figures followed by narrative discussion and justifications.

Two things may require special attention while writing this part of the report:

- ✓ Tables that are too lengthy may better be placed in the appendix
- ✓ Tables and figures should be explained. As tables and figures are expected to be self-explanatory, the textual discussion should not be a duplicate of the table. Only important facts that lead to generalization will be discussed.

This section generally comprises the body of the report, extending over several sub-sections.

It should contain statistical summaries and reductions of the data rather than the raw data. All results should be presented in logical sequences and divided into readily identifiable sections. All relevant results must find a place in the report.

Summary and Conclusion: Toward the end of this section, the researcher should again put down the results of his research clearly and precisely. This part begins with a brief restatement of the problem, the hypothesis, description of the problem and discussion of findings and conclusion of the study. Most readers skip other details of the report and may prefer to read only this part in order to get an overview of the study and judge its relevance. Thus, it should be written with maximum diligence, clarity and brevity. Moreover, this section must focus attention to announce the acceptance or the rejection of the stated hypothesis.

Simply unanswered question that were raised in due course of the study and which required further investigation in there are relevant to this part.

A researcher should also state the implication that flows from the results the study for the general reader is interested in the implication that for understanding the human behavior.

Such implication may have three aspects as stated below:

- A statement the inferences drawn from the present study which may be expected to apply in similar circumstances;
- The condition of the present study, which may limit the extent of the legitimate generalization of the inferences drawn from the study;
- The relevant questions that still remain unanswered or new questions rose by the study along with suggestion for the kind of research that would provide answer for them.

Generally, it is considered as a good practice to finish the report with a short conclusion, which summarize and recapitulates the main points of the study. The conclusion drawn from the study should be clearly related to the hypothesis or the problem that are stated in the introductory section.

At the same times, a forecast of the problem future of the subject and indication of the kind of research, which needs to be done in those particular fields, is useful and desirable. Conclusions are opinion based on the results, whereas recommendations are suggestions for action.

Recommendation: In accordance with the result of the outcome of the research work a researcher may forward (suggest) possible solution that may alleviate the problem in question. The recommendation to be acceptable it should meet the following requirements:

- ✓ Should be clear and unambiguous
- ✓ Need to be realistic, plausible and operational
- ✓ Should point out the responsible body to translate the suggested solution into practice
- ✓ Should be modest than assertive

End matter:

Here belong sections like: **References (bibliography**): It should be based on alphabetical listing of names and **Appendix.**

CHAPTER TWELVE

QUALITATIVE RESEARCH METHODS

Qualitative research is a type of formative research that offers specialized techniques for obtaining in-depth responses about what people think and how they feel. It enables programme management to gain insight into attitudes, beliefs, motives and behaviors of the target population. By its very nature, qualitative research deals with the emotional and contextual aspects of human response rather than with objective measurable behaviors and attitudes.

In previous times qualitative research methods were less accepted and research findings based on these methods were criticized as being of lower quality. However, qualitative research methods can effectively be used to describe social determinants of health and disease. A qualitative study may be designed to explore concepts, develop hypotheses or theories, develop research tools, and clarify the findings of a quantitative study.

Why Use Qualitative Research?

There are both conceptual and practical reasons for using qualitative research. The primary conceptual reason for using qualitative research is that it provides greater depth of response and, therefore, greater consequent understanding than can be acquired through quantitative techniques.

Qualitative research:

- Is a good source of descriptions and explanations of processes in identifiable local contexts.
- Can describe chronological flow, which events led to which consequences and derive fruitful explanations.
- Could help researchers to get beyond initial conceptions and to generate or revise conceptual frameworks.
- Is fundamentally well suited for locating the meanings people place on events, processes, and structures of their lives and for connecting these meanings to the social world.

There are three domains in which qualitative research tends to be used in public health:

1) The first domain includes economic, political, social and cultural, environmental and organizational factors which influence health.
2) The second domain focuses on gaining an understanding of how people make sense of their experiences of health and disease.
3) The third domain includes interaction of actors involved in different public health activities. These domains underscore the role of qualitative research in public health.

How is Qualitative research used?

Qualitative research is used largely in four general ways:

1) as a tool to generate ideas
2) as a step in developing a quantitative study
3) as an aid in evaluating a quantitative study and
4) on occasion, as the primary data collection method for a research topic

Characteristics of qualitative research

Qualitative research methods have many distinguishing characteristics. In comparison with quantitative research methods, qualitative methods take the views of informants, whereas quantitative research takes the ideas of the researcher as points of departure. Furthermore, the lines of reasoning in both methods differ. The line of reasoning in quantitative research is deductive, typically starting with the generation of a hypothesis based on existing theory, then the testing of the hypothesis against existing reality, i.e., being verified or rejected based on the data collected. On the other hand, the line of reasoning in the qualitative method is inductive. However, qualitative researchers may also test emerging hypotheses or theories against data, and thus oscillate between data and theory.

Another characteristic of qualitative research is concerned with reliability and validity. The strength of the quantitative approach lies in its reliability (repeatability) - that is the same measurements should yield the same results time after time, the strength of qualitative research lies in validity (closeness to the truth) - that is good qualitative research should touch the core of what is going on rather than just skimming the surface. The validity of qualitative methods is greatly improved by a process known as triangulation and by independent analysis of the data by two or more researchers.

Some qualitative researchers suggest that qualitative research can complement quantitative methods and explain that qualitative description is a prerequisite for good quantitative research, particularly in areas that have received little previous investigation. This is the first area in which qualitative research complements quantitative research. The second area of complementarity is the validation process (triangulation), where three or more methods are used and the results compared for convergence (e.g., a large scale survey, focus groups, and a period of observation) or as part of multi-method approach which examines a particular phenomenon or topic on several different levels. The third way in which qualitative research can complement quantitative work is by exploring complex phenomena or areas not amenable to quantitative research such as in studies of health service organization and policy.

Qualitative research has its own designs and methods. The study designs include ethnography, phenomenology, grounded theory and participant action research. There are many other qualitative research designs and some are extensions of the more popular ethnographic and phenomenological designs. Varieties of different methods are used by qualitative researchers to answer research questions. The most common methods of data collection in qualitative research are: participant observation, interviews, focus groups, and historical methods. Focus groups are discussed below.

Focus Groups

Focus groups are far more widely used than individual in-depth interviews. The main reasons focus groups are selected more often as the qualitative technique includes:

- **Group interaction**: Interaction of respondents will generally stimulate richer responses and allow new and valuable thoughts to emerge.
- **Cost** and **timing**: Focus groups can be completed more quickly and generally less expensively than in-depth interviews.
- **Idea generation**: A group works best to build on ideas generated.
- **Evaluation of message concepts**: Messages in some rough, pre-production form are presented to potential target audience groups for evaluation and refinement. A group works best because creative personnel can be present to view the group.

Checklist for setting up focus groups

Determine the number of groups needed

- Are there at least two groups for each relevant variable?
- Are there enough groups to rotate the stimulus materials?
- Were groups conducted until responses were showing similarities?
- Are groups needed in different geographic regions?

Determine the composition of each group

- Are respondents of the same social class?
- Are respondents similar in terms of their lifecycle or experience status regarding the topic area?
- Can users and non-users be put together without stifling group interaction?
- Do respondents have similar levels of expertise on complex topics
- Is it important to separate respondents by age and or marital status?
- Are respondents of similar cultural background?

Determine the Length of the Group discussion

- Can the information needs be met in one to two hours?
- If not, is another research technique more appropriate or should additional groups be set up?

Determine the size of the group

- Will respondents be able to say all they know in ten minutes? (Eight-ten respondents)
- Is the subject complex enough for each respondent to give twenty minutes of relevant information?
- Does the subject matter require a small, intimate group?

Determine the group setting

- Will respondents have sufficient privacy to talk freely?
- Is the location accessible to respondents?

- Will respondents be threatened or intimidated by the location?

Distinction between Qualitative and Quantitative Research

Qualitative research

- Provides depth of understanding
- Asks why?
- Studies motivations
- Is subjective
- Enables discovery
- Is exploratory
- Allows insights into behaviour, trends and so on
- Interprets

Quantitative research

- Measures level of occurrence
- Asks how many? How often?
- Studies action
- Is objective
- Provides proof
- Is definitive
- Measures level of actions, trends, and so on
- Describes

Design questions in qualitative research

To choose the best research design(s), appropriate data collection methods and sampling techniques requires a broad understanding of the concepts and methods used in qualitative research. This will enable researchers to justify the study designs, data collection methods and sampling techniques to be employed in the study.

The following points discuss some of the key design questions necessary in designing qualitative research

Defining an area of inquiry

Similar to the quantitative research, the starting point in trying to conduct qualitative research is to specifically define an area of enquiry. This can be drawn from personal experience, reviewing literature and auditing earlier studies. The choice may depend on a desire to solve the problem, the feasibility of the prospective research topic to be investigated, and values and expectations that the study will answer to the benefit the society at large.

Stating the research problem

At this stage, the broad area of the enquiry will be defined in terms of specific issues that will form the core of the study. Literature review helps to provide detailed information on the potential significance of the problem, and to avoid duplication of research. This entails that a gap in scientific knowledge can be described through stating the problem and purpose of the study. In addition, statement of the problem helps to describe what has been done so far and identify questions that have been unanswered. Finally, the ways in which the findings of the present study might be utilized will be forwarded.

Developing a conceptual framework

A conceptual framework is an alternative way of depicting a set of related variables and outcomes in the study in an elaborative schematic diagram. It shows the key factors, presumed relationships and possible outcomes of the research problem. The conceptual framework helps to outline the research questions and core variables included in the data collection instrument. As the study progresses, concepts and their relationships become clearer through interaction with the participants.

Formulating qualitative research questions

A thoroughly defined research problem helps to examine the issue with more specific and relevant questions. Some research questions may be more suitable for qualitative methods, others for quantitative research methods. Therefore, research questions and information needs should be clearly defined first. Then, the choice of appropriate data collection methods (see Annex 4 for choice of data collection methods) and sampling strategies will become straightforward.

Relevant concepts for designing qualitative research

This section attempts to describe some of the basic concepts that have relevance to the design of qualitative research projects.

Natural setting

This describes that the natural context of people's lives is central to qualitative research design. Qualitative research describes social phenomena as they occur naturally and discovers the meaning that people themselves ascribe to events or phenomena. The natural setting is critically important because it may influence the perspectives, experiences, interactions and actions of participants. Unlike the quantitative approach which is conducted under certain controlled settings, the participants in the qualitative research approach are free from any control and no attempt is made to manipulate the situation under study.

Holism

In qualitative research, understanding of a situation is gained through a holistic perspective by looking at a total, rather than a fragmented reality. This takes into consideration many aspects of social, historical and physical context to discover multiple subjective realities.

The human research instrument

The general perspective of qualitative research is that knowledge is generated through exchange of experiences during interaction with people. The researcher is an instrument in qualitative research. Data are collected by the researcher through direct contact with study participants, through one-to-one interviews or group interviews or observation. Hence, the researcher must be involved in every step of the research process from initiation of the process to the final report writing stage. This demands the researcher to be responsive, flexible, adaptive, and a good listener. The researcher is an insider; he or she becomes a full participant in the data collection process. This is in contrast to a quantitative study, where the major decisions about the study are made earlier than the actual data collection. Rather, the researcher in quantitative research tries to be an objective outsider.

Emergent design

One of the main characteristics of qualitative research is its ability to use flexible design. Qualitative designs do not begin with specific issues, over time; a more focused study design emerges as a result of the increased understanding that the researcher gains through the research process. The aim of the researcher is to learn from every step of the research through an inductive approach. There is a constant shifting with the changing phenomena and context, the method that fits now may not work best at another point in time.

Saturation or redundancy

This is the stage at which no further substantial information is required for the study. After several cycles of data collection and analysis, the results of the next data collection can be predicted. This implies that a pattern that makes sense to the researchers and study participants has emerged. This may alert the researchers to stop data collection, implying that the saturation or redundancy stage has been reached.

Sampling strategies in qualitative research

The sampling strategies for qualitative and quantitative research approaches are different. Sampling techniques often used in quantitative research are based upon probability sampling, so that everybody in the study population has an equal chance of being selected. The samples are assumed to be representative and generalizations can be made to their source population. A probability sampling is

convenient when the researcher is interested to answer questions on how many or how strongly the factors under consideration are associated.

In qualitative research, purposive sampling technique is commonly used in selecting the study participants. Purposive sampling, in contrast to probabilistic sampling, is selecting study subjects for their ability to generate rich information.

Purposiveness in qualitative sampling is a strategic approach, and should not be equated with convenience sampling, because the latter is primarily guided by ease of access to study participants. The samples selected for study through purposive sampling are considered to be theoretically representative of the source population, because the range of variation among subjects in the study site can be represented. This implies that a small number of study subjects with rich information may yield credible and valid information.

Sample size

There are no hard and fast rules for obtaining the optimum sample size for qualitative research design. In contrast to quantitative research, the sample size in qualitative study design is usually small and not predetermined. Rather, sampling continues until the researcher determines that information saturation has been reached.

This implies that the selection of study participants continues to the point of redundancy. In general, the sample size in qualitative research depends on the purpose of the study, specific research questions to be addressed, available time and resources, and the credibility of the information generated.

Sampling techniques

Purposive sampling in qualitative research can be achieved through different techniques:

Snowball or chain sampling

This type of sampling technique depends on locating participants by asking others to identify individuals or groups with rich information on the phenomenon under study. This implies that the first subject is used to identify the next person or group to facilitate the identification of cases of interest. This sampling technique is especially valuable when the researcher is new to the study site, and also important for identifying individuals who have rich information but are difficult to reach.

Homogeneous sampling

This type of purposive sampling includes people with basically similar characteristics to study the group in depth. The selection of participants is usually done within certain strata; participants with similar demographic or social characteristics being included in the same strata. Focus groups usually

use this type of sampling. The group interaction stimulates people within the group to discuss their experiences. The main advantage of homogeneous sampling is that it focuses on a similar type of respondents thereby simplifying analysis and group interviewing.

Extreme or deviant

Extreme or deviant sampling chooses extreme cases of outstanding successes or crisis events after knowing the typical case in order to highlight and understand the situation. For example, a researcher may be interested in studying two health facilities, one whose family planning clients are highly satisfied and another whose clients are not satisfied, in order to identify factors that favor or discourage the utilization of services. This type of sampling is valuable to test emerging theories by learning from highly unusual manifestations.

Maximum variation sampling

This is sometimes known as heterogeneous sampling. This is useful for obtaining maximum differences among information-rich informants or group. The subjects included in the study are different from each other based on predetermined criteria. A study of rural, urban and suburban or merchants and academicians or high activity/low activity college students, etc. employs this type of sampling to identify issues that cut across individuals.

Convenience sampling

Study participants are selected based on their ease, accessibility and availability. The researcher selects those individuals who are most readily available. This may help to save time, money and effort. However, it may be the weakest sampling scheme due to its low credibility.

Opportunistic sampling

Additional study subjects may be selected to take advantage of unexpected opportunities at the field level.

Sampling politically important subjects

This type of sampling involves the selection of people who are politically important to give emphasis to the study. It is particularly important for making the program sustainable and ensuring community participation through involving responsible people.

Trustworthiness

Ensuring the quality of data based on certain established criteria is the main activity of the researcher both in qualitative and quantitative research traditions.

This is important, particularly for qualitative research, where the challenge of understanding and making meaning is put upon the researcher. The four common criteria for assessing the trustworthiness of qualitative research findings are: truth value, applicability, consistency and neutrality.

Truth value

Truth-value refers to the ability of the study to detect what the research really aimed at studying. We use internal validity for quantitative research and credibility for the qualitative approach.

Applicability

Applicability refers to the ability to determine the extent to which the findings are applicable in other settings, situations, populations or circumstances.

Consistency

The basic question asked by researchers while dealing with consistency is "can the findings be repeated with the same (or similar) respondents in the same context?" The consistency of findings in both quantitative and qualitative research designs can be explained by reliability and dependability, respectively.

Neutrality

The concept of neutrality refers to the role of the researchers mainly during data collection. This is assessed by objectivity in quantitative research and conformability in qualitative approach.

Summary of Important Points

Qualitative research is a type of formative research that offers specialized techniques for obtaining in-depth responses about what people think and how they feel. A qualitative study may be designed to explore concepts; develop hypotheses or theories; develop research tools; or clarify the findings of a quantitative study.

Qualitative research:

- Is a good source of descriptions and explanation of processes in identifiable local contexts.
- Can describe chronological flow - which events led to which consequences -and derive fruitful explanations.
- Can help researchers get beyond initial conceptions and generate or revise conceptual frameworks.
- Is fundamentally well suited for locating the meanings people place on events, processes, and structures of their lives and for connecting these meanings to the social world.

There are three domains in which qualitative research tends to be used in public health:

- The first domain includes economic, political, social and cultural, environmental and organizational factors which influence health.
- The second domain focuses on gaining an understanding of how people make sense of their experiences of health and disease.
- The third domain includes interaction of actors involved in different public health activities. These domains underscore the role of qualitative research in public health.

Qualitative research is used largely in four general ways:

1) as a tool to generate ideas
2) as a step in developing a quantitative study
3) as an aid in evaluating a quantitative study and
4) on occasion, as the primary data collection method for a research topic

The line of reasoning in quantitative research is deductive. On the other hand, the line of reasoning in the qualitative method is inductive. The strength of qualitative research lies in validity (closeness to the truth).

The study designs in qualitative research include:

- ethnography,
- phenomenology,
- grounded theory and
- Participant action research.

The most common methods of data collection in qualitative research are:

- Participant observation,
- Interviews,
- Focus groups, and
- Historical methods

Key design issues in designing qualitative research:

- Define area of inquiry
- State the research problem
- Develop conceptual framework
- Formulate qualitative research questions

Relevant concepts for designing qualitative research:

- Natural setting,
- Holism,
- The human research instrument,
- Emergent design
- Saturation and redundancy

Purposive sampling: is the sampling method used in qualitative research. Sample size in qualitative research is usually small and not predetermined.

The sampling techniques used in qualitative research are:

- Snowball or chain sampling
- Homogeneous sampling
- Extreme or deviant
- Maximum variation
- Convenience sampling
- Opportunistic
- Sampling politically important subjects

Four or possibly five criteria for assessing the trustworthiness of qualitative research:

- Truth
- value
- Applicability
- Consistency
- Neutrality

CASE STUDY: AN OVERVIEW

The case study method is a very popular form of qualitative analysis and involves a careful and complete observation of a social unit, be that unit a person, a family, an institution, a cultural group or even the entire community. It is a method of study in depth rather than breadth.

The case study places more emphasis on the full analysis of a limited number of events or conditions and their interrelations.

Case study is essentially an intensive investigation of the particular unit under consideration. Young (1849) describes case study as ***"a comprehensive study of a social unit be it that unit, a person, a group, a social institution, a district or a community".***

In short, we can say that case study method is a form of qualitative analysis where in careful and complete observation of an individual or a situation or an institution is done. Here efforts are made to study each and every aspect of the concerning unit in minute detail and then from case data generalization and inference are drown.

The nature (characteristics) of case study method

Study of a unit: The researcher can take one single social unit or more of such units for his study purpose. It may even take a situation to study comprehensively.

Intensive or depth study: The quantitative method studies a subject in its particular aspect and not in its entirety. But the case study method, deal with every aspect of the subject and studies it's both intensively and extensively, i.e., each element is studied deeply and no element left untouched.

Knowledge of behavioral pattern: The behavioral factor is studied directly and not by indirect and abstract approach. It tries to describe the complex behavioral pattern of a unit and, having done these tries to discover the factors, which will rationally account for them. It aims at description as well as explanation of the unit it studies. It also explains the place and role of unit in its surrounding social environment.

E.g., under this method we not only study how many crimes a given person has done but also peep in to the factors that forced him to commit crime when we are making a case study a man as a criminal

The study of the whole unit: It makes complete study of the social unit covering all facts.

Causal study: An effort is made to know the mutual inter-relationship or causal factors.

Assumptions

Case study method is based on several assumptions of which the most important are:

The assumption of the fundamental unity of human nature: There is uniformity in basic human nature in spite of the fact that human behavior may vary according to situations.

- All human beings share a common nature and fundamentally alike in some crucial mater.
- The assumption of comprehensive study of all unit concerned
- The assumption of studying the natural history of the unit concerned.

Utility of case study method

Formation of valid hypothesis**:**

- **Aid of sampling**: The case study helps in classifying the units in a much better and efficient manner. It helps to fix definitely the character of a particular unit, and this intern helps to classify it under a well determined head
- **Aid to form questionnaires**: The case study will help to select quires, which will yield a desire response.
- **Appreciation of quantitative analysis in actual situation:** The researcher who does not come in contact with the actual situation and individuals would not quite appreciate the various statistics about the delinquency, prostitution, larceny, gangstersim, etc. A researcher doing actual case work can appreciate this better

Limitations of case study method

Case studies are seldom comparable. Since the subject under case study tells history in his own word, logical concepts and units of scientific classification have to read into it or out of it by the investigator Real information is often not collected because the subjectivity of the researcher does enter in the collection of information in a case study.

According to Read Bain the case study data are not significant since they do not provide universal information

There is a danger of false generalization in view the fact that no set rules are followed in collection of the information and only few units are studied.

- It consumes more time and requires a lot of expenditure.
- Case study method is based on several assumptions, which may not be very realistic.
- Case study method can be used only in a limited sphere: it is not possible to use it in case of a big society. **Sampling is not possible under a case study method**.

Response of the investigator is an important limitation of the case study method. He often thinks that he has full knowledge of the unit can himself answer about it. In case the same is not true then the result of the study is in question. In fact this is the fault of the researcher rather than the method.

Small-unit-based conclusion: However, deep and penetrating a study may be, its conclusion will not be generally valid if the unit chosen for study is very small.

Highly expensive and time consuming: For deep study of a number of units the cost and time factor is prohibitive. It may take year to study some unit.

Possibility of error: There are high chances of making errors in the selection of case, observation, noting and interview.

References Materials

Ackoff, Russell.l (1961). The design of Social science Research, Chicago Press. USA

Bailey Kenneth D. (1978). Method of Social research, New York

Babbie (1973). Survey Research Method. Wadsworth Publishing Company, Inc, USA.

Fisher, R. A. (1960). The Design of Experiment 7th Edition, Hafner Publishing Co. New York.

Joseph Gibaldi (1995). MALA Handbook for Writers of Research Papers, forth Edition the Modern Language Associatetion, New york.

Green E. Paul, D. S. Tull & Gerald Albaum (1998). Research for Marketing Decisions. Prentice-Hall of India, Private Limited, New Delhi.

Kenneth R. Hoover (1988). The Elements of Social Science Thinking (Fourth Edition). St. Martin's Press, New Yourk

C.R. Kothari. (1990). Research Methodology, Methods & Techniques. Wishwa Prakashan. Wiley Eastern Limited, New Delhi

Fred N. Kerlinger (1973). Foundation of Behavioral Research, Second Edition, New yourk

Jill Hessey and Roger Hussey (1997). Business Research Method . MackMilan Press Ltd

Lawrence F. Locke, Waneen Wyrick Spirduso & Stephen J. Silverman (1993). Proposal That Work, A guide for Planning Dissertation and Grant, Sage Publications, Inc. Newbury Park, California

Lundberg. G.A. (1942), Social Research, N.Y.

Pearson, T. (1968). The Grammar Of science, London. Wishwa Prakashan, Wiley Eastern Limited, New Delhi.

Vatsyayan. (1989). Methods & techniques of Social Survey and Research (in questions & answers). Kedar Nath Ram Nath, New Delhi.

William G. Zikmund (1984). Business Research Methods, Fofth Edition, Harcourt Brace Collage, USA.

R.K.Yin (1995). Case Study Research Design and Methods. Second Edition. International Educational and professional Publishers, Thousand Oake, London.

Young, P.V. (1849). Scientific Social Survey and Research. New York.