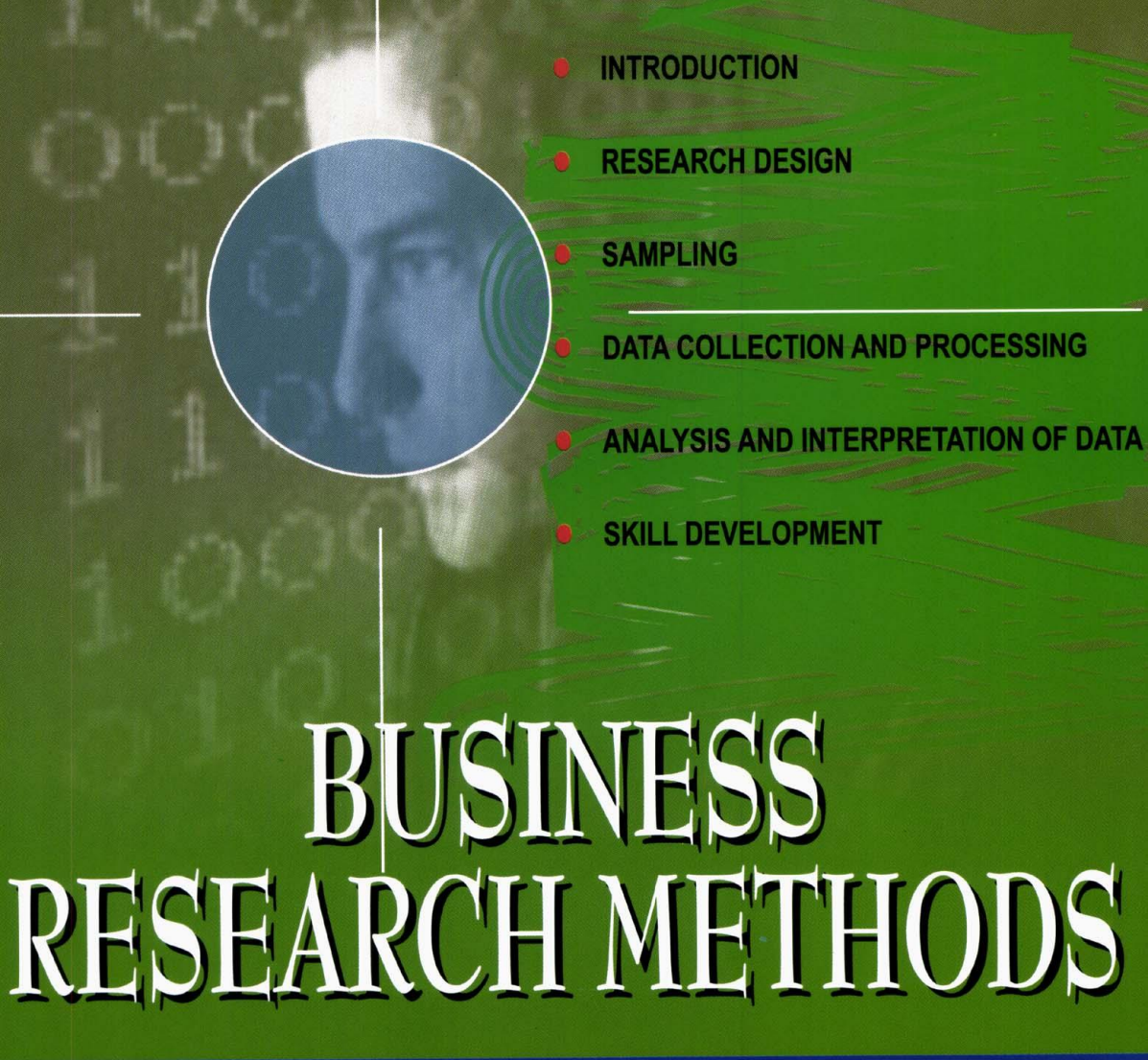

- INTRODUCTION
- RESEARCH DESIGN
- SAMPLING
- DATA COLLECTION AND PROCESSING
- ANALYSIS AND INTERPRETATION OF DATA
- SKILL DEVELOPMENT

BUSINESS RESEARCH METHODS

O.R. KRISHNASWAMI
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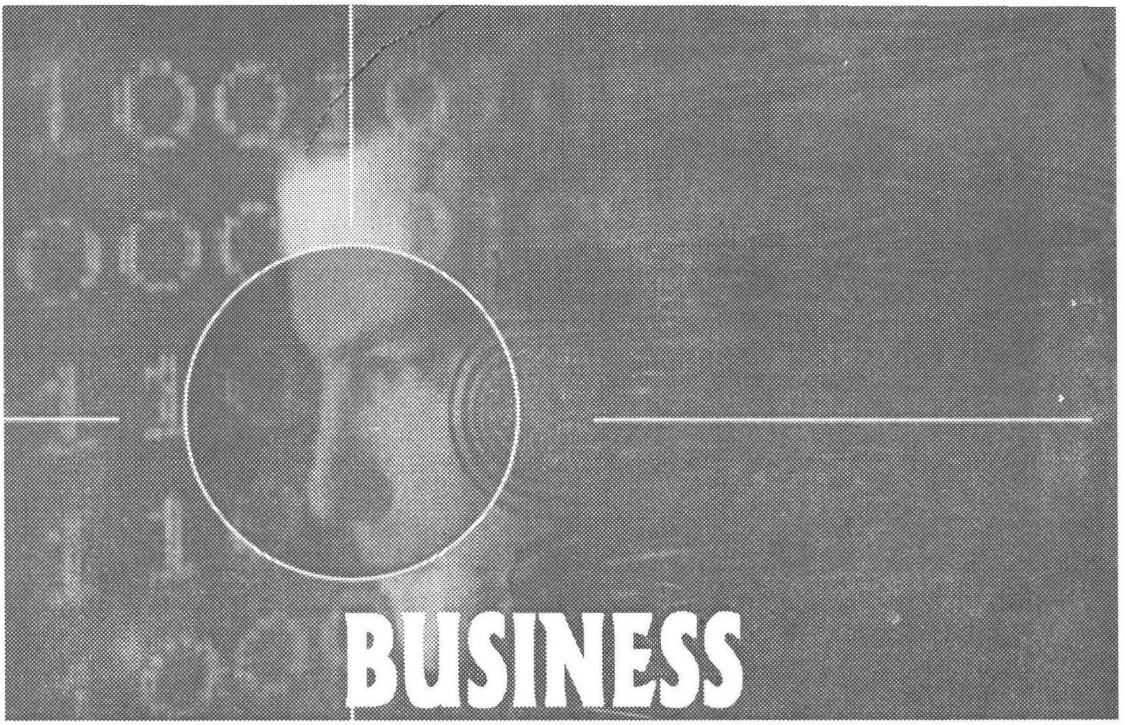

BUSINESS RESEARCH METHODS

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CONTENTS

CHAPTER - 1

INTRODUCTION

Introduction - Meaning- Objectives-Types of Research- Research Approaches- Research Methods- Steps in Research

WHAT IS RESEARCH?

Introduction

Curiosity or inquisitiveness is a distinctive feature of human beings. Curiosity to know about ourselves, our institutions, our environment, our planet, other planets, and the universe is inherent in us. Innumerable questions go on arising in our mind: What are the parameters of sound health of a person? How do problems of health arise? What are the remedies? What is the shape of the earth? How do solar and lunar eclipses arise? How is rain formed? Why are places like Ootacamund, Simla cooler than their nearby places? Is there any life in other planets? What are stars? Why day and night alternate? Why the mode of life and activities of human beings vary from place to place? Why there is no communal harmony in certain places? Why there is abject poverty in some countries like India and African countries? Why does the performance of similar organizations vary? What are the causes of various business problems like recession or industrial unrest? And so on. Whenever such questions arise we seek answers to them. Whenever we encounter problems, we try to find solutions to them. Seeking answers to questions and finding solutions to problems have been the basis

of human progress. A systematic search for an answer to a question or a solution to a problem is called research.

Definition of Research

Research simply means a search for facts – answers to questions and solutions to problems. It is a purposive investigation. It is an "organized inquiry."[1] It seeks to find explanations to unexplained phenomenon, to clarify the doubtful propositions and to correct the misconceived facts. How is this search made? What are possible methods or approaches?

The search for facts may be made through either

(a) arbitrary (or unscientific) method or

(b) scientific method.

Arbitrary method: Arbitrary method of seeking answers to questions is based on imagination, opinion, blind belief or impression. For example, it was believed that the shape of the earth was flat; a big snake swallows the sun or moon causing solar or lunar eclipse. Similarly, we form our own impressions about various phenomena and issues.

The arbitrary method suffers from serious weaknesses or drawbacks. It is subjective, the finding will vary from person to person depending on his impression or imagination. It is vague and inaccurate.

Scientific method: This is a systematic rational approach to seeking facts. It eliminated the drawbacks of the arbitrary method. It is objective, precise and arrives at conclusions on the basis of verifiable evidences.

Therefore, search for facts should be made by scientific method rather than by arbitrary method. Then only we may get verifiable and accurate facts. Hence ***Research is a systematic and logical study of an issue or problem or phenomenon through scientific method.*** An analysis of the definitions given by notable authorities may reveal the proper meaning and nature of the concept of research.

Kerlinger defines research as a "systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena."[2] The term "systematic, controlled, empirical and critical" describe the characteristics of scientific method. Whether research needs to be an "investigation of hypothetical propositions about presumed relations" is debatable. Research does not always call for a hypothesis. It may

also be carried out for the formulation of hypotheses. It may also be designed to gather descriptive information on a phenomenon.

Young defines Research as "a scientific undertaking which, by means of logical and systematic techniques, aims to:

(1) discover new facts or verify and test old facts,

(2) analyse their sequences, interrelationships and causal explanations,

(3) develop new scientific tools, concepts and theories which would facilitate reliable and valid study of human behaviour."[3] This exhaustive all-inclusive definition specifies all the major aims of research, viz., discovery of new facts, verification and testing of old facts, analysis of interrelationships and causal explanations and development of new tools, concepts and theories.

Characteristics of Research

The above definitions reveal the various characteristics of research:

1. Research is a ***systematic and critical investigation*** into a phenomenon.
2. It is not a mere compilation, but a purposive investigation; it aims at describing, interpreting and explaining a phenomenon.
3. It adopts ***scientific*** method
4. It is ***objective*** and ***logical***, applying possible *tests* to validate the measuring tools and the conclusions reached.
5. It is based upon *observable experience or empirical evidence.*
6. Research is directed towards finding answers to pertinent *questions* and solutions to *problems.*
7. It emphasizes the development of *generalization, principles or theories.*
8. The purpose of research is not to arrive at an answer, which is personally pleasing to the researcher, but rather one, which will stand up the *test of criticism.*[4]

Objectives or Purposes of Research

The objectives or purposes of research are varied. They are:

1. Research ***extends knowledge*** of human beings, social life and environment. Scientists and researchers build up the wealth of

knowledge through their research findings. They search answers for various types of questions: What, Where, When, How and Why of various phenomena, and enlighten us. The bodies of knowledge have been developed by research in general and pure or fundamental research in particular.

2. Research unravels the mysteries of nature; brings to light hidden information that might never be discovered fully during the ordinary course of life.

3. Research ***establishes generalizations and general laws*** and contributes to theory building in various fields of knowledge. Our knowledge of isolated events is connected together to draw generalizations and general laws. Law of gravitation, Law of demand, and principles of organization such as unity of command and scalar principle, the theory of consumer behaviour and motivation theories are some examples for such generalizations, laws and theories.

4. Research ***verifies and tests*** existing facts and theory and these help improving our knowledge and ability to handle situations and events. Merton argues: " Empirical research goes far beyond the passive role of verifying and testing theory...Research plays an active role, it performs at least four major functions.... It initiates, it formulates, it deflects, and it clarifies theory."[10]

5. General laws developed through research may enable us to make reliable predictions of events yet to happen.

6. Research aims to ***analyse inter-relationships*** between variables and to derive ***causal explanations***; and thus enables us to have a better understanding of the world in which we live.

7. Applied research aims at ***finding solutions*** to problems.... socio-economic problems (e.g., social unrest, unemployment, poverty) health problems, human relations problems in organizations and so on. Thanks to the fruits of research, we have better quality of life, longer life span and better control over events.

8. Research also aims at ***developing new tools, concepts, and theories*** for a better study of unknown phenomena.

9. Research aids planning and thus contributes to *national development*. Research - social science research in particular.

RESEARCH APPROACHES

Introduction

The clear identification of the approaches to the research can be made only by analysing the different types of research.

The very basic purpose of conducting the descriptive research work is to analyse the facts and investigate the existing situation. It focuses mainly on the different dimensions of the problem under study. The researcher doesn't have any control over the variables associated with the research. He uses these variables to find some solutions for the existing problems.

In an analytical study, the researcher basically concentrate more on setting the hypothesis to test the same by considering the different elements associated with the problems. The process of evaluation will be critical and accurate.

The purpose of Applied research is to find a solution to the immediate problem faced by the society. It is an action oriented research study. The Buyer behaviour can be studied in marketing research through the applied research.

The pure research aim at finding some things to the society. It is an indepth scientific research focussed in developing knowledge to the society. It is also called as fundamental research brings new ideas, proposition to the existing body of the knowledge. Pure research is popular in the field of science and technology.

Quantitative research is based on the quantity or the amount. The outcome of the study is presented through monetary or numerical terms. Whereas qualitative approaches are popularly used to find the behaviour of the people under study. The qualitative term is used extensively to assure at the results. The consumer behaviours, workers attitude, the changes in the tastes and fashions of the consumers etc.. will be analysed in qualitative research.

Research Approaches: A bird's eyeview of the different types of research identifies the two basic approaches to the research.

V.Z. a) Quantitative Approach

b) Qualitative Approach

(a) Quantitative Approach

If the sales of the company is correlated with the profits for the previous years, it clearly gives the confidence to the researcher to draw the conclusion that sales and income or profits are directly related to each other, and when the sales increases, profits of the company also increases. But, such type of generalisation is based on certain parametric assumptions under given situations and in a particular circumstances.

The Quaiitative approach can also be further classified into inferential experimental and simulation approach to the research.

Inferential approach needs a mass data with uniform characteristics and with set standard variables. These characteristic features are set or established by collecting the information from the mass, either by survey or by observing the respondents. Once the characteristic features are set to the targeted group. The researcher can draw the inferences easily.

The quantitative approach of analysis used regularly the different types of qualitative analysis. The analysis will be based on the numerical, percentages and in the monetary terms. The variables used for analysis will be tested with the suitability of holding the relationship to each other. For example. The profitability of the company mainly depend on the total turnover of the company for different period of time. The amount of profit and the quantity of sales of that period will be expressed in term of Rupees and for a definite period of time.

Further, quantitative research also consists of usage of many statistical tools like Arithmetic mean, Median, Mode, Standard deviation percentage etc... The usage of these tools on the actual facts of the research enable the researcher to draw the inference individually as well as collectively. If the variables used are behaving consistently over a period of time, the same results could be utilised for drawing the generalisation of trends.

In case of experimental approach, the researcher will have greater control over the variables used in the research. In many examples/ situations, the researcher has the freedom to manipulate the variables and characteristic features. Once the set variables are defined, the researcher can study the effects and causes for such effects more accurately and can draw the conclusions.

Simulation involves the constructions of artificial environment with which the researcher achieves his goal of finding the solution to the problems

or drawing inferences. Most of the social science researchers uses simulation approach to develop a numerical model based on created research environment. However, the researcher cannot develop a permanent model for dynamic business environment, but it gives a base for placing for future.

(b) Qualitative Approach

It is based on subjective assessment of behaviour, attitude, opinions, behaviour impressions etc.... The generalisation of research funding are mainly made on the basis of non qualitative terms, in otherwards, by adopting group discussion, group interviews, projective techniques, indepth interviews of the respondents etc... The detailed discussion on quantitative and qualitative approaches are further discussed in the subsequent chapters.

SOCIAL SCIENCE RESEARCH

Social Sciences

Sciences are broadly divided into natural (or physical) sciences and social sciences. Social sciences include various disciplines dealing with human life, human behaviour, social groups and social institutions. They consist of Anthropology, Behaviour Science, Commerce, Demography, Economics, Education, Geography, History, Law, Linguistics, Management, Political Science, Psychology, Public Administration, Sociology and Social Work. Though these sciences are treated as separate branches of knowledge for the purpose of study, they are interdependent studies of the different aspects of the same object, viz., man. By applying scientific method of study, the social sciences have grown and advanced man's knowledge of himself.

Social sciences are not exact science like physical sciences, as they, unlike the latter, deal with human beings. Human nature and man's environment are so complex that it is more difficult to comprehend and predict human behaviour than the physical phenomena. No two persons are alike in feelings, drives or emotions. No one is consistent from one moment to another. The behaviour of human beings is influenced by biological, psychological, socio-cultural, temporal and environmental factors. It is difficult to see the underlying uniformities in the diversity of complex human behaviour. A controlled experiment, which is *sine qua non* of an empirical science, in general well nigh impossible in social sciences.

Objectives of Social Science Research

The aim of social science research, like research in physical sciences, is to ***discover new facts*** or ***verify*** and ***test*** old facts.

It tries to understand the *human behaviour* and its *interaction* with the environment and the social institutions.

It tries to find out the *causal connection* between human activities and natural laws governing them.

Another purpose of social science research is to develop *new scientific tools*, concepts and theories, which would facilitate reliable and valid study of human behaviour and social life.

Functions or Uses of Social Science Research

The functions of Social Science Research are varied. They are:

1. ***Discovery of Facts and their Interpretation:*** Research provides answer to questions of what, where, when, how and why of man, social life and institutions. They are half-truths, pseudo-truths and superstitions. Discovery of facts and their interpretation help us discard such distortions and thus enlighten us and contribute to our understanding of social reality. Research strengthens our desire for truth and opens up before our eyes, hidden social mysteries.
2. ***Diagnosis of Problems and their Analysis:*** The developing countries have innumerable problems such as poverty, unemployment, economic imbalance, economic inequality, social tension, low productivity, technological backwardness, etc. The nature and dimensions of such problems have to be diagnosed and analysed; social science research plays a significant role in this respect. An analysis of problems leads to an identification of appropriate remedial actions.
3. ***Systematization of Knowledge:*** The facts discovered through research are systematized and the body of knowledge is developed. Thus, research contributes to the growth of various social sciences and theory building.
4. ***Control over Social Phenomena:*** Research in social science areas equips us with first-hand knowledge about the organizing and working of the society and its institutions. This knowledge gives us a greater power of control over the social phenomena.
5. ***Prediction:*** Research aims at finding an order among social facts and their causal relation. This affords a sound basis for prediction in several cases. Although the predictions cannot be perfect because of the inherent limitations of social sciences, they will be fairly useful for better social planning and control.

6. ***Development Planning:*** Planning for socio-economic development calls for baseline data on the various aspects of our society and economy, resource endowment, peoples needs and aspirations, etc., Systematic Research can give us the required data base for planning and designing developmental schemes and programmes. Analytical studies can illuminate critical areas of policy and testing the validity of planning assumptions. Evaluation studies point out the impact of plan, policies and programmes and throw out suggestions for their proper reformulation.

7. ***Social Welfare:*** Social research can unfold and identify the causes of social evils and problems. It can thus help in taking appropriate remedial actions. It can also give us sound guidelines for appropriate positive measures of reform and social welfare.

Scope of Social Science Research

The fields of social science research are virtually unlimited, and the materials of research endless. Every group of social phenomena, every phase of human life, and every stage of past and present development are materials for the social scientists.[5]

The areas of research in various social sciences listed in the Annexure would give an idea of the vast scope for research in social sciences.

Inter-disciplinary Approach

Social Science research calls for inter-disciplinary approach, for human life cannot be compartmentalized into psychological, social, economic or political aspects. "Man lives in a socio-economic and political world and thrives on its varied relationships. It is inconceivable that the study of bare and isolated events on any one aspect of man's life would yield any meaningful results."[6] A discipline-specific study of a social problem from an angle of, say economics or sociology or political science only cannot give a correct and total view of the problem.

CLASSIFICATION OF RESEARCH (METHODS OF RESEARCH)

Introduction

Although any typology of research is inevitably arbitrary, Research may be classified crudely according to its major intent or the methods.

1. According to the *intent*, research may be classified as:
   - (i) Pure Research
   - (ii) Applied Research
   - (iii) Exploratory Research
   - (iv) Descriptive Study
   - (v) Diagnostic Study
   - (vi) Evaluation Studies
   - (vii) Action Research
2. According to the *methods of study*, research may be classified as:
   - (i) Experimental Research
   - (ii) Analytical Study
   - (iii) Historical Research
   - (iv) Survey

The Nature of Classification

The above classification is not a watertight demarcation. It is just an *approach* to differentiate the distinctive approaches to research for the purpose of better understanding. The different types of research are, of course, not sharply distinguishable from one another. There may be overlapping between one type/method and another. For example, pure research may involve experimentation or case study or analytical study; Evaluation studies may apply experimental or survey methods; Experimental Research is necessarily an analytical study; Survey Research may involve quasi-experimental approach or analytical approach; and so on.

In the following sections, the meaning, nature and the other aspects of each of the above types and methods of research are discussed.

Choice of Type/Method of Research

The quality of a research project depends, among the other things, upon the *suitability* of the method selected for it. Hence care should be taken in selecting the appropriate method of research for any project. A through knowledge of types and methods of research is essential for this purpose.

TYPES OF RESEARCH ACCORDING TO INTENT

(i) Pure Research

Pure research is undertaken for *the sake of knowledge without any intention to apply it in practice,* e.g., Einstein's theory of relativity, Newton's contributions, Galileo's contribution etc.

Pure research is also known as *basic* or *fundamental* research. It is undertaken out of *intellectual curiosity* or inquisitiveness. It is not necessarily problem-oriented. It aims at extension of knowledge. It may lead to either discovery of a new theory or refinement of an existing theory. The development of various sciences owes much to pure research. The findings of pure research enrich the storehouse of knowledge that can be drawn upon in the future to formulate significant practical researches. In the words of Dixey, "natural knowledge pursued for its own sake without any direct view to future utility will often lead to results of most unexpected kind and of very highest practical importance."[7] Thus, pure research lays the foundation for applied research. The findings of pure research formed the basis for innumerable scientific and technological inventions like steam engine, machines, automobiles, electronic gadgets, electronic data processing, telecommunication, etc., which have revolutionized and enriched our human life.

(ii) Applied Research

Applied research is carried on to find solution to a real-life problem requiring an action or policy decision. It is thus problem-oriented and action-directed. It seeks an immediate and practical result, e.g., marketing research carried on for developing a new market or for studying the post-purchase experience of customers.

There is vast scope for applied research in the fields of technology, management, commerce, economics and other social sciences. Innumerable problems are faced in these areas. They need empirical study for finding solutions.

Though the immediate purpose of an applied research is to find solutions to a practical problem, it may incidentally contribute to the development of theoretical knowledge by leading to the discovery of new facts or testing of a theory or to conceptual clarity.

The Interplay between Pure and Applied Research

The distinction between pure and applied research is *not absolute,* but at best only *relative,* for pure research may have significant potential for its

application to the solution of a practical problem now or later (e.g., application of Newton's Law of Gravity in space research); and applied research may end up making a scientific contribution to the development of the theoretical knowledge (e.g., Elton Mayo's Hawthorne Study's contribution to Behavioural science).

The terms, 'pure' and 'applied' just represent the *polar ends* of a *continuum*. "Research studies have differing degrees of 'purity' and 'applicability', depending on whether their purpose is solely to advance knowledge in a field or to solve some functional problem.

Goode and Hatt have highlighted the mutual contribution between pure and applied research·

(iii) Exploratory or Formulative Research

Meaning

Exploratory research is preliminary study of an unfamiliar problem about which the researcher has little or no knowledge. It is similar to a doctor's initial investigation of a patient suffering from an unfamiliar malady for getting some clues for identifying it. "It is ill-structured and much less focused on pre-determined objectives." It usually takes the form of a pilot study.

Though it is a separate type of research, it is appropriate to consider it as the first stage of a three-stage process of exploration, description and experimentation.

(iv) Descriptive Research

Meaning

Descriptive study is a *fact-finding* investigation with adequate interpretation. It is the simplest type of research. It is more specific than an exploratory study, as it has focus on particular aspects or dimensions of the problem studied. It is designed to gather descriptive information and provides information for formulating more sophisticated studies. Data are collected by using one or more appropriate methods: observation, interviewing and mail questionnaire.

(v) Diagnostic Study

Meaning

This is similar to descriptive study but with a different *focus*. It is directed towards *discovering what* is happening, *why* is it happening and *what*

can be done about. It aims at identifying the *causes* of a problem and the *possible solutions* for it.

Purpose

A diagnostic study may also be concerned with discovering and testing whether certain variables are associated, e.g., are persons hailing from rural areas more suitable for manning the rural branches of banks? Do more villagers than city-voters vote for a particular party?

(vi) Evaluation Studies

Meaning

Evaluation study is one type of applied research. It is made for *assessing the effectiveness* of social or economic *programmes* implemented (e.g., family planning scheme) or for assessing the impact of developmental projects (e.g., irrigation project) on the development of the project area.

Suchman defines evaluation as " determination of the results attained by some activity (whether a programme, a drug or a therapy or an approach) designed to accomplish some valued goal or objective."[8]

(vii)Action Research

Meaning

Action research is a type of evaluation study. It is a *concurrent evaluation* study of an *action programme* launched for solving a problem/for improving an existing situation.

In the quest for development, advancement, excellence and promotion of welfare of people, government, institutions and voluntary agencies undertake action programmes for achieving specific goals or objectives. Land reform programmes, agricultural extension programmes, social welfare programmes, human resource development programmes, managerial improvement programmes, rural development programmes, programmes for improving the quality of life in factories and offices, etc., are some examples of action programmes. This plethora of development programme has given impetus to action research. With the pressing need to assess the relative effectiveness of different approaches to the same goal or the worthwhileness of one goal as against another, research has been called upon to play a closer and relevant role for action. The criterion of relevance for action is of critical importance in action research.

TYPES OF RESEARCH ACCORDING TO METHODS OF STUDY

(i) Experimental Research

Introduction

There are various phenomena such as motivation, productivity, development and operational efficiency, which are influenced by various variables. It may become necessary to assess the effect of one particular variable or one set of variables on a phenomenon. This need has given rise to experimental research.

Meaning

Experimental research is designed to assess the effects of particular variables on a phenomenon by keeping the other variables constant or controlled. It aims at determining *whether* and in *what manner* variables are related to each other. The factor, which is influenced, by other factors is called a *dependent variable*, and the other factors, which influence it, are known as *independent variables*. For example, agricultural productivity, i.e., crop yield per hectare is a dependent variable and the factors such as soil fertility, irrigation, quality of seed, manuring and cultural practices which influence the yield are independent variables.

(ii) Analytical Study or Statistical Method

Meaning

Analytical study is a system of procedures and techniques of analysis applied to quantitative data. It may consist of a system of mathematical models or statistical techniques applicable to numerical data. Hence, it is also known as the *Statistical Method*. This study aims at testing hypothesis and specifying and interpreting relationships. It concentrates on analyzing data in depth and examining relationships from various angles by bringing in as many relevant variables as possible in the analysis plan.

(iii) Historical Research

Meaning

Historical study is a study of past records and other information sources with a view to reconstructing the origin and development of an institution or a movement or a system and discovering the trends in the past.

It is descriptive in nature. It is a difficult task; it must often depend upon inference and logical analysis of recorded data and indirect evidences

rather than upon direct observation. Hence, it is aptly described as "the induction of principles through research into the past and social forces which have shaped the present."

(iv) Surveys

Meaning

Survey is a 'fact finding' study. It is a method of research involving collection of data directly from a population or a sample thereof at particular time. It must not be confused with the mere clerical routine of gathering and tabulating figures. It requires expert and imaginative planning, careful analysis and rational interpretation of the findings.

Data may be collected by observation, or interviewing or mailing questionnaires.

The analysis of data may be made by using simple or complex statistical techniques depending upon the objectives of the study.

(v) Case Study

Meaning

A case study is an *in-depth* comprehensive study of a person, a social group, an episode, a process, a situation, a programme, a community , an institution or any other social unit.

It is one of the most popular types of research methods. Its purpose may be to understand the *life cycle* of the unit under study or the *interaction* between factors that explain the present status or the development over a period of time. Some examples of a case study are: a social-anthropological study of a rural or tribal community; a causative study of a successful cooperative society; a study of the financial health of a business undertaking; a study of labour participation in management in a particular enterprise; a study of juvenile delinquency; a study of life-style of working women; a study of slum dwellers; a study of urban poor; a study of economic offenses; a study of refugees from another country.

(vi) Field Studies

Meaning

Field studies are scientific enquiries aimed at discovering the *relations and interactions* among sociological, psychological and educational variables in social institutions and actual life situations like communities, schools, factories,

organizations and institutions. A social or institutional situation is selected and the relations among the attitudes, values, perceptions and behaviours of individuals and groups in the selected situation are studied. Some examples of field studies are: Dollard's study of *caste and class in a southern town*,[9] Malinowski's *investigations of the Trobriand Islanders*[10]; Lynd's study of *Middletown*[11], Jone's study of *the socio-economic basis of class in Aknon, Ohio*[12]; Mann-Kanitkau's study of *land and labour in a Deccan village*[13]; Aiyyappan's study of *social revolution in a Kerala village.*[14]

STEPS IN RESEARCH

Introduction

The task of research is a sequential process involving a number of clearly delineated steps. There are some variations in the number of steps, their names and their sequence suggested by different writers, but there is much similarity among their suggestions. No one however, claims that the research process is truly linear, moving from one step after another in an order. Some steps may be taken in a different order; some steps may have to be retraced; some may be carried on simultaneously; some may be omitted; in some projects some steps can be covered quickly, while in another cases, they may require longer time. In spite of these variations it is desirable to outline the steps involved in the task of planning and executing a project, and also the order in which they have to be taken.

Steps in Research

According to Emory, the research sequence consists of four major stages:[15]

1. Exploration of the situation: If the problem is in an area in which the investigator has previously conducted research, he may move quickly to the development of the research proposal including time and budget estimates. However, if the problem posed is an unfamiliar one, he may adopt two-stage approach; first to propose a separate exploratory study, second, to move to development of the main study after the exploratory study is over. The feasibility, the availability of data, etc. will be explored at this stage.

2. Development of the research design: At this stage, the formal research plan is developed.

3. Data collection: Data are collected by adopting appropriate methods of data collection.

4. Analysis and interpretation of the results: After the fieldwork is over, the data are processed, tabulated and analysed. Then the findings are interpreted. Finally, a report is written for communicating the findings.

Pauline V. Young classifies the phases of research process into: (1) Precise formulation of the selected problem, (2) formulation of working or exploratory hypothesis, (3) observation and exploration of the problem, (4) uniform recording of the data obtained, (5) classification of the data into series, and (6) scientific generalizing.[16]

These steps are not mutually exclusive; neither are they separate and distinct. They do not necessarily follow each other in any special order. Some of them may re-enter after preliminary use of them.[17] For example, some preliminary observation is inevitable before an adequate working hypothesis can be formulated. After its formulation, systematic observation is indispensable.

Nachmias [18] identify *seven* stages in the research process: problem, hypotheses, research design, measurement, data collection, data analysis and empirical generalizations.

According to Vimal Shah, a research process involves the following major activities:[19]

1. Identification and selection of the research problem,
2. Choice of a theoretical framework for the research problem,
3. Formulation of the research problem,
4. Design of the experiment or inquiry,
5. Definition and measurement of variables,
6. Sampling procedures,
7. Tools and techniques for gathering data,
8. Coding, editing and processing of data,
9. Analysis of the data, and
10. Reporting research.

After evaluating the different stages of research expressed by research expert, the following Heads have to be short listed as research process:

1. Planning

Selection of the problem

Formulation of the selected problem

Operationalisation of concepts

Preparation of the research design

Planning report-writing work.

2. Operation

Construction of tools of data collection

Pre-testing tools and their revision

Collection of data

Processing of data

Analysis of data and interpretation of results

3. Reporting

Drafting the report: Description of the research process; summary of findings; Suggestion for action and for further research.

Finalisation of the report

Forwarding the report copies to the target audience/clients/users.

All the above steps involved in a research process do not constitute a time order linear sequence. There can be overlappings and recyclings depending on the nature of the study. Nevertheless one should not fail to complete the sequence of steps required in scientific procedure.

QUESTIONS

Section A

1. Define the term 'research'
2. What are the objectives of social science research?
3. Mention any two merits of social science research?
4. What is meant by 'social science research'?
5. Mention any two limitations of social science research?
6. Define the term 'Pure Research'.
7. What is meant by Invajustic study.
8. What is meant by evaluating study.
9. What is Action Research.
10. What is meant by analytical study.

Section B

1. Analyse the characteristic feature of social science research.
2. Distinguish between:
   a) Pure research and applied research.
   b) Discriptive study and analytical study.
   c) Survey and case study
3. "Objectives of Research are varied" Justify this statement from your own views.
4. Write a brief note on Social Science Research? and state its objectives.
5. Social Science Research is Inter-disciplinary in approach explain?
6. Evaluate field study.

Section C

1. Define the term research? What are the characteristic features of social science research. What are the merits of social science research.

2. *What are the steps involved in research process?*

3. *Discuss of Social Science Research its objectives & Scope? State uses of Social Science Research?*

4. *What is case study? Why it is considered Popular type of Research method? Explain with example.*

(Hint: Points given in page 15 should be expanded with suitable example)

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CHAPTER - 2

RESEARCH PROBLEM

Defining the Research Problem - Meaning Selection of the problem- Techniques involved in defining the problem.

THE PLANNING PROCESS

Introduction

Research is an organized endeavour. Like any other organized work, research requires proper planning. Planning means deciding in advance. Planning of research means deciding the question or issue to be studied, setting the objectives of the study and determining the means of achieving those objectives. It is an intellectual process. It requires intellectual curiosity, intelligence, imagination and vision, and knowledge of methodology of research. *Planning systematizes* the research work. It eliminates aimless intellectual wandering. It gives direction to the work.

Planning Process

The planning stage of a research project involves the following steps:

1. Selection of a problem for research: This involves identification of a few problems and selecting one out of them, after evaluating the alternatives against certain selection criteria.

2. Formulation of the selected problem: The selected problem is defined and transformed into researchable questions.

3. **Formulation process:** The process involves
   (i) Developing title
   (ii) Building a conceptual model
   (iii) Defining the objective of the study
   (iv) Setting investigative questions
   (v) Formulation of hypotheses
   (vi) Operational definition of concepts
   (vii) Delimiting the scope of the study.

1. SELECTION OF A PROBLEM FOR RESEARCH

Introduction

The selection of a problem is the first step in research. The term *'problem'* means a question or issue to be examined. The selection of a problem for research is not an easy task; itself is a problem. It is least amenable to formal methodological treatment. Vision, an imaginative insight, plays an important role in this process.

This problem of selection arises when a student has to undertake research as a part of his course requirement. In some universities a project study is prescribed as a requirement for even undergraduate programmes. In several universities a project study is a partial requirement of postgraduate programmes like M.Com., M. B. A., M. S. W., etc. Research is an important requirement of M. Phil. and of Doctoral degree programmes.

In each of these cases, a student has to select a problem for his research.

Similarly, faculty members of colleges and universities select problems for research as an academic pursuit. In case of projects sponsored by planning bodies, departments of government, industries or other organizations, the sponsors themselves invariably suggest the problems to be studied.

The nature of the problem to be selected depends upon the level at which the research is done. A problem appropriate for undergraduate/master degree students will necessarily be a modest one. The emphasis is upon the *learning process* of a beginner. A problem to be selected for M. Phil./Ph.D. programme must be a major problem requiring comprehensive treatment. In this case, the emphasis is upon both *skill development and contribution to knowledge.*

On the other hand, a problem to be selected by an experienced academic researcher must be a complex problem meant for making a *significant contribution* to the development or refinement of theory or to policy making.

The Mode of Selection

The students who undertake research as a course requirement do their research work under the guidance of a professor. What should be the mode of selection in their cases? Should a problem be suggested by the guide or be selected by the researcher himself?

A beginner in research may, of course, prefer the first choice. He will be happy if the problem is suggested by the guide, for his problem of selection is easily solved. But is such suggestion appropriate?

The suggestion of the problem by the guide means an *imposition*. It is an attempt to get some work done rather than to train the student to do research on his own. It destroys spontaneity. The problem suggested by the guide may not be a topic in which the student is really interested. Then he may not find pleasure in studying it, and the study will become an unwanted burden to him. Therefore, it is *better to choose the problem oneself*. Of course, the guide can help the candidate to help himself. He may dig out the candidate's area of interest and show him the way. The actual selection should be choice of the candidate himself.

One with a critical, curious and imaginative mind and is sensitive to practical problems could easily identify problems for study.

Sources of Problems

The sources from which one may be able to identify research problems or develop problem awareness are:

1. **Reading:** When we critically study books and articles relating to the subject of our interest, pertinent questions may arise in our mind. Similarly, areas of research may strike to our mind when we read research reports.
2. **Academic experience:** Classroom lectures, class discussions, seminar discussions and out-of-class exchanges of ideas with fellow students and professors will suggest many stimulating problems to be studied.
3. **Daily experience:** Life is dynamic. We learn new things and undergo new experiences every day. If we are alert, inquisitive and sensitive

to life situations, we may hit upon questions worth of investigation, "It is a mark of scientific genius to be sensitive to difficulties where less gifted people pass untroubled by doubts."[1]

The story about Newton justifies to this. Though apples might have fallen on the heads of people before Newton's time, only the sensitive Newton applied his mind on this event which led to the discovery of "Law of Gravitation."

4. **Exposure to field situations:** Field visits, internship training and extension work provide exposure to practical problems which call for study.
5. **Consultations:** Discussions with experts, researchers, administrators and business executives will help a researcher to identify meaningful problems for research.
6. **Brain storming:** Intensified discussion within a group of interested persons may often be a means of identifying pertinent questions, and of developing new ideas about a problem.[2]
7. **Research:** Research on one problem may suggest problems for further research.
8. **Intuition:** Sometimes new ideas may strike to one's mind like a flash. Reflective mind is a spring of knowledge.

Process of Identification

The process of identification of problems for academic research may consist of the following *steps*:

1. Selection of the discipline: The discipline or subject in which one proposes to do research may be selected, e.g., Economics, Commerce, Management, Technology, Psychology etc. The selection of the discipline is easy. One can select any subject, which one has studied thoroughly and which has interested him most. Where one has to do research in his field of specialization (e.g., Marketing Management or Finance Management or Personnel Management in M.B.A. Programme), one has to choose the subject of one's specialization.

2. Demarcating the broad area or a particular aspect of the selected subject: The second step is to select a *particular aspect* of the selected subject. For example, if the selected subject is Financial Management, then one may select capital budgeting, financial leverage, working capital management or profit management as specific area of study.

One who says that one is willing to do research on any aspect of discipline does not mean business or does not know oneself.

One should identify his specific area of interest. Interest in a particular area of a subject develops out of educational background, reading a good book or inspiration received from a professor.

3. Identifying two or more specific topics in the selected broad area: This is the final step in *identification of problem*. This requires a grasp of the branch of the subject as a whole and awareness of work already done on it. A review of concerned literature including research theses and survey of research published by the Research Councils like Indian Council of Social Science Research, New Delhi, intensive reading and reflective thinking, and discussion with the guide will help a student in identifying specific topics or issues for research. Both an uncharted path and a *well-trodden path are dangerous* to a beginner in research. If he chooses an unexplored problem, he has to grope in the dark and may get frustrated. On the other hand, if he selects a problem, which has already been thoroughly studied, he may not learn anything new nor contribute anything to the knowledge. It is desirable for him to adopt a *via media* approach. He may identify problems on which he can get the guidance of a few articles or books.

A student cannot just select anyone of the identified problems for his research. He has to evaluate them for choosing the most appropriate one. How can this evaluation be done? Against what criteria?

Criteria of Selection

The selection of one appropriate researchable problem out of the identified problems requires *evaluation* of those alternatives against certain criteria. These criteria may be grouped into:

(a) Internal (or personal) criteria or factors, and

(b) External criteria or factors.

Internal criteria consist of

(1) Researcher's interest: The problem should interest the researcher and be a *challenge* to him. Without interest and curiosity, he may not develop sustained *perseverance*. Even a small difficulty may become an excuse for discontinuing the study.

Interest in a problem depends upon the researcher's educational background, experience, outlook and sensitivity.

(2) Researcher's competence: A mere interest in a problem will not do. The researcher must be competent to plan and carry out a study of the problem. He must have the ability to grasp and deal with it. He must possess adequate knowledge of the subject matter, relevant methodology and statistical procedures.

(3) Researcher's own resources: In the case of a research to be done by a researcher on his own, consideration of his own financial resource is pertinent. Does the cost involved in conducting the study of the problem is within the means of the researcher? If it is beyond his means, he will not be able to complete the work, unless he gets some external financial support. Time resource is more important than finance. Research is a time consuming process. What is the time that the researcher can be able to spare for the research work? Is it adequate to meet the time requirements of the problem? If not, the work cannot be completed within the prescribed time limit. As it is difficult to foresee the eventual time constraint, it is desirable to *over-estimate the time requirement and to under-estimate the time availability.* In this connection, available tidbits of time (say 5 or 10 minutes at a time) should not be counted, as nothing could be done in 5 or 10 minutes, only *large chunks* of time available should be counted.

External factors include

(1) Researchability of the problem : The problem should be researchable, i.e., amenable for finding answers to the questions involved in it through scientific method. "Although every problem in science involves a question or a series of questions, not every question qualifies as a scientific problem"[3] To be researchable a question must be one for which *observation* or other *data collection* in the real world can provide the answer. Many questions cannot be answered on the basis of information alone. They may *involve value elements,* e.g., what is merit for the purpose of employee promotion? What is 'fairness' to the workers? Some questions may not be researchable because procedures or techniques are inadequate, e.g., how will a new fiscal policy affect distributive justice? Which new management trainees have potential for top management?

(2) Importance and urgency: Problems requiring investigation are unlimited, but available research efforts are very much limited. Therefore in selecting problems for research, their *relative importance* and significance should be considered. An important and urgent problem should be given priority over an unimportant one. For example, in industrial management today,

problems of productivity, capacity utilization, motivation and industrial unrest are more important than problems of financial leverage, profit planning, vertical/ horizontal integration, marketing etc. Research must be focused on useful and urgent problems.

(3) Novelty or originality: The problem must have novelty. There is no use of wasting one's time and energy on a problem already studied thoroughly by others.

This does not mean that replication is always needless. In social sciences in some cases, it is appropriate to replicate (repeat) a study in order to verify the validity of its findings to a different situation.

(4) Feasibility: A problem may be a new one and also important, but if research on it is not feasible, it cannot be selected. Hence feasibility is a very important consideration.

Some of the *questions* that should be considered in examining the feasibility are:

- Are suitable research techniques such as measurement devices and techniques of analysis available?
- Are accurate and reliable data available? The reliability of the findings depends upon the quality of data. In some cases, available data may be tinged by emotions. Ethnic conflicts, strikes and lockouts, poverty and affluence are examples of topics heavily weighted by emotions.
- Will the authorities of the concerned institutions extend the required cooperation in furnishing data or permit access to records? Some organizations like Commercial banks, sole proprietary and partnership concerns and private limited companies do not easily extend cooperation to researchers.
- Will the respondents be willing to be interviewed?
- Can the study be completed within the time available?

On the basis of the consideration of the above questions, the feasibility of the problem should be determined.

(5) Facilities: Research requires certain facilities such as well-equipped library facility, suitable and competent guidance, data processing facility, etc. Hence, the availability of the facilities relevant to the problem must be considered.

(6) Usefulness and social relevance: Above all, the study of the problem should make significant contribution to the concerned body of knowledge or to the solution of some significant practical problem. It should be *socially relevant.* This consideration is particularly important in the case of higher-level academic research and sponsored research.

(7) Research personnel: Research undertaken by professors and by research organizations require the services of investigators and research officers. But in India and other developing countries, research has not yet become a prospective profession. Hence, talented persons are not attracted to research projects. Employment in research projects is just considered as a stop-gap arrangement pending securing a regular placement. Therefore appropriate qualified and experienced research personnel are not easily available for the study of some problems.

Conclusion: Each identified problem must be evaluated in terms of the above internal and external criteria and the most appropriate one may be selected by a research scholar. The *overall guideline* to be followed in this selection process is:

Select a feasible and researchable problem which is interesting to you and within your competence and manageable within the available time and resources, and at the time same time has some importance and social relevance, and for which required facilities are available.

2. FORMULATION OF THE SELECTED PROBLEM (DEFINING THE PROBLEM)

Introduction

The problem selected for research may initially be vague. The question to be studied or the problem to be solved may not be clear. Why the answer/ solution is wanted also may not be known. Hence, the selected problem should be defined and formulated. This is a difficult process. It requires intensive reading of a few selected articles or chapters in books in order to understand the nature of the selected problem. The reading at this stage should be focused on the *'classics' and research papers* on the topic. Gunnar Myrdal's *The Challenge of World Poverty* in the study of anti-poverty programmes, Peter F. Drucker's *The Effective Executive* in the study of managerial effectiveness, Harold's paper on *Dynamic theory* in Growth Economics are a few examples of classics. The researcher should read such selected literatures,

digest, think and reflect upon what is read and digested. He should also discuss with learned persons.

Then only can he gain *insight* into the chosen problem and be able to define and formulate it.

What is Formulation?

Formulation means *translating and transforming* the selected research *problem/topic* into a scientifically researchable question it is concerned with specifying exactly what the research problem is and why is it studied. The formulation should include both the *what and the why* aspects.

Merton[4] identifies three principal *components* in the progressive formulation of a problem for research:

1. The originating question (what one wants to know?)
2. The rationale (Why aspects)
3. The specifying questions (possible answers to the originating questions).

(1) The originating question It indicates what the problem is. It may be of different kinds. It may call for discovering new and more decisive facts relating to the subject-matter of study; it may *put to question* the adequacy of certain concepts, may be related to *empirical validity;* or it may be related to the *structure* of an organisation.

(2) Rationale of the question: Rationale is the statement of *reasons* why a particular question is posed. It states how the answer to the question will *contribute to theory and /or practice.* The rationale helps to make a discrimination between scientifically important and trivial question. In short, it "states the case for the question in the court of scientific opinion."[6]

(3) Specifying question: The originating question is decomposed into several specific questions in order to identify the observations/data that will provide answer to them. These specific questions should be simple, pointed, clear and empirically verifiable. They are known as *'investigative' questions.* It is only such specific questions which when synthesized can afford the *solution* to the problem selected for research. This solution has implications for theory/ systematic knowledge and/or for practice.

Formulation Process / Techniques involved in defining the Problem

The process of formulation involves the following steps:

1. Developing title: The title should be carefully worded. It should indicate the *core* of the study, reflect the *real intention* of the researcher, and show

on what is the focus e.g., "Financing small-scale industries by commercial banks." This shows that the focus is on commercials banks and not on small-scale industries. On the other hand, if the title is "the Financial Problem of Small-scale industries", the focus is on small-scale industries. The title may also indicate the geographical area of the study.

2. Building a conceptual model: On the basis of our theoretical knowledge of the phenomenon under study, the *nature of the phenomenon, its properties/ elements and their inter-relations* should be identified and structured into a framework. This conceptual model gives an exact *idea* of the research problem and shows its various *properties* and variables to be studied. It serves as a basis for the formulation of the objectives of the study and the hypotheses to be tested. In order to workout a conceptual model we must make a careful and critical study of the available literature on the subject-matter of the selected research problem. It is *for this reason, a research student is expected to select a problem for research in his field of specialization.* Without adequate background knowledge, a researcher cannot grasp and comprehend the nature of the research problem.

3. Defining the objective of the study: The objectives refer to the *questions to be answered* through the study. They indicate what we are trying to get from the study.

4. Setting investigative questions: Once the objectives of the research/ or the general research questions have been defined, the formulation moves to the next level, i.e., *investigative questions.* These *sub-questions* are set up for each of the major research objectives/questions. These specific questions guide the *details* of the research efforts, including the development of *concepts, operational definitions and measurement* devices. There may be several *sub-levels* of the investigative questions, each being progressively narrower in scope and more specific.

5. Formulation of hypotheses: The hypotheses are *tentative propositions* relating to investigative questions. We formulate them to be tested in our research. They either *describe* the properties of variables or show the *relationships* between them. They aim at *answering* the research questions. They determine what facts will be sought and what research procedures will be used.

6. Operational definition of concepts: The next step in the formulation process is to define operationally the concepts involved in the title, objectives, investigative questions and hypotheses. The operational definitions specify the

measurement parameters of the variables. Scales/indices are constructed for measuring abstract concepts.

The operational definitions of concepts and measurement devices enable us to decide exactly the *data needs* of the research.

7. Delimiting the scope of the study: This means demarcation of the scope and dimensions of the study. A complete study of any phenomenon is well-nigh un-manageable. It would entail such an overwhelmingly large volume of data that it would require more than a student's life time to gain a glimpse of the phenomenon.

Importance of Formulation

'A problem well put is half-solved'. This saying *highlights* the importance of proper formulation of the selected problem. The primary task of research is collection of relevant data and the analysis of data for finding answers to the research questions. The proper performance of this task depends upon the identification of exact data and information required for the study. The formulation serves this purpose. The clear and accurate statement of the problem, the development of the conceptual model, the definition of the objectives of the study, the setting of investigative questions, the formulation of hypotheses to be tested and the operational definition of concepts and the delimitation of the study determine the exact *data needs* of the study. Once the exact data requirement is known, the researcher can plan and execute the *other steps* without any waste of time and energy. Thus, formulation gives a *direction* and a *specific focus* to the research effort. It helps to *delimit* the field of enquiry by singling out the pertinent facts from a vast ocean of facts and thus saves the researcher from becoming lost in a welter of irrelevancies. The determination of exact information needs through the formulation process *prevents a blind search and indiscriminate gathering* of data, which my later prove irrelevant to the problem under study. The hypotheses to be tested determine the appropriate *statistical techniques* to be adopted for analysis. Thus all the *major tasks* - sampling, selecting appropriate methods of collection of data, construction of tools for data collection, designing plan of analysis - can be *planned exactly* without any waste of efforts. Hence, the saying 'a problem well put is half-solved' is true.

QUESTIONS

Section A

1. Define 'research problem'.
2. Should the academic guide suggest the research topic to the scholar.
3. Define the term 'concept'.
4. Mention any two problems associated with defining the concepts.
5. What is meant by abstract concepts?
6. What is meant by planning process?
7. What are investigatives questions?
8. What is meant by research plan?
9. Mention any two features of research planning?
10. Mention any two problems associated with planning for research.
11. State External factors that influence problem formulation?
12. State Internal factors that influence problem formulation?

Section B

1. Time is vital constraint in Research than Financial Resources? Why?
2. "Suggesion of Research problem by guide means imposition"? Why?
3. Discuss about various sources of Research problems?
4. "Although every problem in science involve question or series of qustions not every question qualifies as a scientific problem". Justify this statements from your views?

Section C

1. Write a detail note on Identification of Research problem?
2. What questions relating to Research problem are answered in Freasability study?
3. What is Formulation process? Explain various steps in formulation process in detail?
4. "A problem well put is half solved" Discuss this statment from point of view of importance of formulation of Research problem?

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CHAPTER - 3

Research Design

Research Design-Meaning-Need-Features -Important concepts relating to research design Types of research design and basic principles of experimental designs.

CONCEPTS

Introduction

The title of the research problem, the objectives of the study, the investigative questions and the hypotheses consist of concepts. Those concepts should be *precisely defined*. This is an important step in the formulation of the research problem. It is the definitions of concepts that determine the information needs of the study. Therefore, precise definitions of concepts are essential for planning the subsequent steps in the research process.

Definition

Each science attempts to investigate particular sections or aspects of reality, with an abstract system of thought to interpret those segments. So it develops its own terms or concepts for communicating its findings. For example, 'utility' in Economics represents 'the capacity of a thing to satisfy a human want'; it has no ethical or moral significance; 'responsibility' in management means 'obligation' of a subordinate to do the assigned job. A scientist abstracts meanings out of observed reality and attaches names to those meanings. Such names are concepts. They are indicated by words or phrases.

Significance

The significance of concepts stems from their ability to transfer information in the form of images about experiences in the empirical world. By means of concepts, researchers can transmit to their colleagues and to the public a whole system of experience acquired through research."[1]

Useful concepts represent *generalized abstraction* regarding empirical phenomena. For example, the concept 'weight' represents a trait common to various physical object, 'Income' represents a trait common to different persons. The usefulness of concepts is evaluated by the extent to which they permit meaningful classification of objects or traits. "Concepts, then, are means not only of communication but also of generalizations."

Characteristics of Concepts

Concepts have several Characteristics. It is important for a researcher to understand them.

1. Concepts are *symbols* which we attach to the bundle of meanings that we hold.
2. Concepts *represent only one part* of reality. That is, we abstract only certain meaning or implications out of the object for our use. For example, a concept like book means different things to different persons according to their needs. To the author, it is an embodiment of his organized thoughts; to the publisher and seller, it is a physical object of a given weight and volume.
3. Thus different people hold *different concepts* of the same thing.
4. Concepts also *represent various degrees of abstraction.* For example, a specific calculator, at a first level of abstraction is considered as a mechanical devise for making mathematical computations. At the third level, it may be considered as an item of office equipment. And so on. Each of these levels of concept abstraction is useful for one purpose or another. For a study of computation satisfaction, the first level is relevant; for a study of office productivity, level 2 and 3 may be of interest.

Types of Concepts

Concepts may be classified into (a) concrete concepts and (b) abstract concepts.

Concrete concepts symbolize material objects, which can be seen, touched and felt, e.g., book, table, building.

Abstract concepts refer to properties or characteristics of objects, e.g., weight, height, attitude, intelligence, leadership. They are *constructs*, i.e., they *represent inferences* deduced from observable events. They symbolize *inferences "at a higher level of abstraction* from concrete events and their meaning cannot be easily conveyed pointing to specific objects, individuals or events."[2]

Problems in Defining Concepts

The process of defining concepts is not easy. Even in defining such common place objects as 'book', or 'water', we may face difficulties. We can point these objects and show pictures of them, but to present a precise word picture is extremely difficult. Abstract concepts like 'motivation', 'intelligence', or 'frustration' are still more difficult to define. Unclear and inadequate definitions lead to lack of clarity in scientific communication. Some of the *reasons* for this problem are given below:

1. Concepts develop from a shared experience: When scientists perceive or experience particular things, they symbolise them through scientific terms. The dictionary definitions are seldom satisfactory. What a chemist means by 'titration', demographer by 'the net reproductive rate', or management expert by 'the managerial effectiveness' would require very elaborate verbal definitions. They can be best understood by participating in the *operations* to which these terms refer.

2. Term used to denote scientific concepts may also have meanings in other frames of reference: many scientific words are newly coined or taken from Greek or Latin roots, e.g., Audit from 'Audire'; cooperation from 'co-operari'. Concepts may also be named after their discoverers, e.g., "Raman's Effect". These concepts have their scientific meanings only. But many scientific terms are taken from common usage, e.g., 'mass' – a big pile of something – refers to a quality of matter in physics; 'culture' which means tillage or rearing - refers to the totality of the social heritage of a society in sociology. Such multiple meanings of concepts cause confusion.

3. A term may refer to different phenomena: For example, the term 'function' has several usages. In popular usage, it means ceremony. In economic sense, it means activity (e.g., functions of a commercial bank); in a mathematical sense, it refers to relationship, e.g., the level of living is a function of economic position. And so on. Such words cause confusion.

4. Different terms may refer to the same phenomenon: For example, the words 'enquiry', 'study', 'research', investigation', have similar meanings;

'status', rank', position' have similar meanings. A scientist may use such different words with some subtle differences in meaning, but his reader may take them as synonyms.

5.A term may have no immediate empirical referent: Some concepts may have logical relationship with other concepts, but may not be empirically measurable, e.g., 'social milieu' or 'social structure' in sociology, 'managerial effectiveness' in management are not empirically measurable.

6.The meaning of concepts may change: Terms are continuously modified, as knowledge accumulates. Definitions change and the consequent shifts in meaning confuse the reader. For example, the term 'intelligence' originally was conceived as an inherited stable intellectual potential. Now it is redefined as a 'score' made on certain types of tests.

Types of Definition of Concepts

Different levels of abstraction and the combination of abstractions into constructs are important to research. In communication, there is a constant interplay among levels of abstracting and types of meaning. Accordingly, concepts may be defined in several ways: (1) ostensive definition, (2) verbal definition, (3) descriptive definition and (4) operational definition.

Ostensive definition: A concept may be defined ostensively. Russell describes ostensive definition as "any process by which a person is taught to understand a word other than by the use of other words."[3] We may define 'elephant' by pointing to a life-like model of elephant; 'typing' may be defined by pointing to the typing work performed by a typist. This kind of definition is not suitable for verbal communication.

Verbal definition: This means definition of a *word in terms of other words* either at the same or a higher or lower level of abstraction. For example, a customer is defined as a 'patron.' This definition is of no value unless one understands the meaning of patron. Of even less value is a definition in terms of higher-level abstractions, e.g., a definition of customer as a source of business income. It says very little about the nature of customerness or patronage.

Verbal definitions are of two types: (1) descriptive definitions and (2) operational definitions.

Descriptive or Nominal definition: This is a dictionary type definition in terms of other concepts. This is also known as a *conceptual definition.* Conceptual definitions that facilitate communications have two traits. First, a

concept is described by other concepts, not by itself, e.g., the definition of 'power' as 'the ability to use power' is useless. But a description in terms of *lower* level abstraction is more useful, e.g., the definition of a customer as one who buys the products or services from a given firm. Second, a *positive* definition is preferable to a negative one. For example, defining "intelligence" as "a characteristic that lacks form, colour and weight" contributes little to communication. The descriptive definitions of concepts are of little value in research where we seek to measuring concepts.

Operational definition: This is quantification of a nominal definition, i.e., it is a definition in terms of specific measuring or *testing criteria* or operations. This definition specifies the operations which observe, measure and record the phenomenon symbolized by the concept. These criteria should define a person, action, condition or phenomenon in an unambiguous manner. The criteria should also be so *objective* that any competent observer can secure the same results by using the definition. Some example of descriptive and operational definitions of concepts are given below:

Only when operational definitions are used, can variables be measured with precision and consistency, and through the corresponding empirical observations, can hypotheses and theorizes be tested.

The important *definition criteria* of operational definition are: (1) *adequacy* of meaning, (2) *precision* of meaning, and (3) *linkability*. Linkability means combination of two or more concepts in the development of concept interrelationship such as propositions, hypotheses and theories. In this sense, "concepts are the *knots* in a network of systematic interrelations in which laws and theoretical principles form the threads."[4]

Hypothetical concepts: Concepts that cannot be given operational definitions are usually termed as hypothetical concepts."[5] Opinions regarding their role in the scientific method vary. Bridgman,[6] a founder of the operational approach, claimed that concepts which cannot be operationally defined prevent scientific progress. According to him, the sole meaning of concepts is related to their operations; "the concept is synonymous with the corresponding set of operations."

This orthodox operational approach did not stand the test of time, since it was recognized that hypothetical concepts had an important role in the stage of theorizing. For example, "subconscious", a hypothetical concept, has served in developing theories of personality and behaviour.

Steps in Operationalisation of Concepts

Operational definitions of concepts are the means by which we quantify variables. They are always necessary in a research project.

The process of operationalization or defining concepts operationally is a comp.ex task, requiring extensive knowledge and reflective thinking. It involves a series of steps or procedures to be followed to obtain a measurement. The broad steps involved in the process of Operationalisation are as follows:

The researcher should select the major concepts from the title of the research problem, the objectives of the study, the investigative questions and the hypotheses. He should attempt to operationally define each of those concepts in the following manner:

1. **Examine the definition** of the concept *in the published literature*- books, research articles, research reports etc.- keeping the chronology of the definitions in mind.

2. **Discover** the various *usage* of the concepts and *analyse* the apparent *meaning elements* of the concept, e.g., the concept of political participation' consists of such elements as (a) awareness of voting right, (b) awareness of citizen's responsibilities, (c) an analysis of the manifestoes of contesting parties and their political philosophy and economic policy, and (d) choosing a particular party and voting for it.

3. **Identify** the *measurement criteria* relating to the meaning element and specify appropriate quantitative measurements for those criteria. This step is relatively easier in the case of concrete concepts. For example, the maximum limit of investment in plant and machinery for defining a small-scale industrial unit is fixed as so many lakhs of Rupees. Usually the limit fixed by the government is adopted in such cases.

In the case of an *abstract concept*, identify the indirect operations which observes and measure the phenomenon symbolized by the concept, and *construct a measuring scale* by assigning appropriate score to each of them on the basis of their relative importance.

4. **Formulate a tentative definition** based on the measurement dimension or the measurement scale, as the case may be.

5. Submit the definition to as wide a *critical appraisal* as possible.

6. Make final revision on the basis of the legitimate criticism received.

7. **Examine the degree of congruence** between the conceptual definition and the operational definition of the concept. If 'intelligence' is defined

conceptually as 'the ability to think abstractly' and operationally by an 'intelligence test' what is the congruence between the two definitions? Does the score secured by an individual in the intelligence test represent everything that the concept 'intelligence' is supposed to convey?

An operational definition specifies so precisely the process of measuring a variable that any one else could repeat the steps and obtain the same measurement. However, the *limitation* of any operational definition should be recognized. "Its very specificity and concreteness limit the breadth and depth of what we are able to measure."[7] Thus, it is rarely sufficient to capture the rich and complex ideas contained in a theoretical construct. A researcher should be aware of this inadequacy and imperfection of an operational definition. He should do his best to improve his operational definition of concept.

RESEARCH DESIGN OR PLAN

Meaning

A research design is a logical and systematic plan prepared for directing a research study. It specifies the objectives of the study, the methodology and techniques to be adopted for achieving the objectives. It 'constitutes the blueprint for the collection, measurement and analysis of data.'[8] It is "the plan, structure and strategy of investigation conceived so as to obtain answers to research questions... The plan is the overall scheme or program of research."[9] A research design is the program that guides the investigator in the process of collecting, analyzing and interpreting observations."[10] It "provides a systematic plan of procedure for the researcher to follow."[11]

Essentials of a Good Research Design

The above definitions give the essentials of a good research design. They are:

1. It is a *plan* that specifies that objectives of the study and the hypotheses to be tested.
2. It is an *outline* that specifies the sources and types of information relevant to the research questions.
3. It is a *blueprint* specifying the methods to be adopted for gathering and analyzing the data.
4. It is a *scheme* defining "the domain of generalizability, i.e., whether the obtained information can be generalized to a larger population or to different situations."[12]

Nature of Research Design

A research design is indispensable for a research project. However, it is *not a precise and specific* plan like a building plan to be followed without deviations, but rather a *series of guideposts* to keep one going in the *right direction.* It is a *tentative plan* which undergoes modification, as circumstances demand, when the study progresses, new aspects, new conditions and new relationships come to light and insight into the study deepens. For example, the scope of a study may be narrowed down, when it is discovered that certain kinds of data are not available; the sampling method may be modified from 'random sampling with probability proportional to size to simple random sampling' if a list of units of study with particulars of size is not readily available; and so on.

Besides, a research study cannot be extensive and intensive as the researcher may like it to be. It has to be geared to the availability of data and the cooperation of the informants. It has also to be kept within the *manageable limits, i.e.,* within the researcher's mental ability to grasp the implications, his competence and the amount of time and other resources available for the purpose. Thus, a research design "represents a *compromise* dictated by many practical considerations."[13]

Classification of Designs

There are a number of crucial research choices, various writers advance different classification schemes, some of which are:

1. Experimental, historical and inferential designs (American Marketing Association)
2. Exploratory, descriptive and causal designs (Selltiz, Jahoda, Deutsch and Cook)
3. Experimental, and ex-post fact (Kerlinger)
4. Historical method, and case and clinical studies (Goode and Scates)
5. Sample surveys, field studies, experiments in field settings, and laboratory experiments (Festinger and Katz)
6. Exploratory, descriptive and experimental studies (Body and Westfall)
7. Exploratory, descriptive and causal (Greed and Tull)
8. Experimental, 'quasi-experimental designs' (Nachmias and Nachmias)
9. True experimental, quasi-experimental and non-experimental designs (Smith)

10. Experimental, pre-experimental, quasi-experimental designs and Survey Research (Kidder and Judd).

These different categorizations exit, because 'research design' is a complex concept. In fact, there are different perspectives from which any given study can be viewed. They are:

1. The degree of formulation of the problem (the study may be *exploratory or formalized)*
2. The topical scope - breadth and depth - of the study (a *case or a statistical* study)
3. The research environment: field setting or laboratory (*survey, laboratory experiment)*
4. The time dimension (*one-time or longitudinal)*
5. The mode of data collection (*observational or survey)*
6. The manipulation of the variables under study (*Experimental or ex-post facto)*
7. The nature of the relationship among variables (*descriptive or causal).*

Importance of Research Plan

A research without a pre-drawn plan is like an ocean voyage without Mariner's compass. The preparation of a research plan for a study aids in establishing *direction* to the study and in knowing exactly what has to be done and how and when it has to be done at every stage. It enables the researcher to consider beforehand the various *decisions* to be made: What are the objectives of the study? What are the investigative questions? What are the sources of data? What is the universe of the study? What sampling method is appropriate? And so on.

Without a plan, research work becomes unfocussed and aimless empirical wandering, the researcher would find it difficult, labourious and time-consuming to make adequate discriminations in the complex inter plan of factors before him; he may not be able to decide which is relevant and which is not, and may get lost in a welter of irrelevancies. The use of a research design prevents such a *blind search* and indiscriminate gathering of data and *guides* him to *proceed* in the *right direction.*

A research plan prescribes the *boundaries* of research activities and enables the researcher to channel his energies in the right work.

With clear research objectives in view, the researcher can proceed systematically toward their achievement.

The design also enables the researcher to anticipate potential problems of data gathering, Operationalisation of concepts, measurement, etc.[14]

Preparation of the Research Design

Planning involves deciding things in advance. Accordingly, the preparation of a research plan involves a careful consideration of the following *questions* and making appropriate *decisions* on them:

1. What the study is about?
2. Why is the study made?
3. What is its scope?
4. What are the objectives of the study?
5. What are the propositions to be test?
6. What are the major concepts to be defined operationally?
7. On the basis of what criteria or measurements, the operational definitions to be made?
8. When or in what place the study will be conducted?
9. What is the reference period of the study?
10. What is the typology of the design?
11. What kinds of data are needed?
12. What are the sources of data?
13. What is the universe from which the sample has to be drawn?
14. What is the sample size?
15. What sampling techniques can be used?
16. What methods are to be adopted for collecting data?
17. What tools are to be used for collecting data?
18. How the data are to be processed?
19. What techniques of analysis are to be adopted?
20. What is the significance of the study?
21. To what target audience the reporting of the findings is meant?
22. What is the type of report to be prepared?
23. What is the time period required for each stage of research work?
24. What is the time limit within which the whole work should be completed?
25. What is the cost involved?

These questions should be considered with reference to the researcher's interest, competence, time and other resources, and the requirements of sponsoring agency, if any. "Thus, the *considerations* which enter into making decisions regarding what, where, when, how much, by what means constitute a plan of study or a study design.

The Contents of a Research Design

After making decisions on the above questions, a formal research plan is drafted, incorporating those decisions. The format may vary depending on the purpose for which the study is undertaken, but, in general, the research plan of a research student/academician may cover the following essential *sections:*

1. Introduction: The introduction of a research plan or proposal should place the research problem in its historical perspective, state the need for studying it, and the researcher's precise interests in the study of the problem.

2. Statement of the problem: The research problem should be well defined, pointing out its core nature and its importance. The issue relating to the problem may also be stated. This statement gives direction to the research process.

3. Review of the previous studies: On the selected theme, some studies might have been previously made by other. A review of available literature will bring out information on them. The salient features of those studies may be briefly described and the gaps may be pointed out. Does the selected study fill in the gap? Or is it a replication of an earlier study made elsewhere? In the later case, the justification for studying the same problem may be stated with reference to environmental differences, temporal difference, etc.

4. Scope of the study: A complete study of any problem is well nigh unmanageable. It would entail such an over-whelming volume of data that it would require more than a student's life-time to comprehend and complete the study. Therefore, the scope and dimensions of the study should be *delimited* with reference to the topical scope - breadth and depth, geographical area to be covered, reference period, the type of institutions/respondents to be studied, the issues to be analysed, etc. The *purpose of this demarcation* is to make the study manageable in terms of the researcher's aim, interest and competence and available techniques, time, finance and facilities.

5. Objective of the study: The specific objectives of the study should be stated clearly. These refer to the *questions* to which the researcher proposes

to seek answers through the study. Although there is no limit to the number of research objectives, it is desirable to limit the objectives to a reasonable number. What is reasonable depends upon the time limitation, resource constraints, capability etc. it is wise to pick objectives that are challenging but not impossible to achieve.

6. Conceptual model: This section is the heart of the research plan. This is where the researcher formulates and develops the structure of relationships among the variables he is investigating. The logical connection of the variables is delineated; the assumptions, and propositions used to develop the explanatory framework are included. The entire research project rests upon the theoretical framework.

7. Hypotheses: These are logically deduced from the theoretical framework above. These refer to the anticipated outcome or possible answers to the research questions. They should be conceptually clear, specific and simple.

8. Operational definition of concepts: The major concepts used in the title of the study, its objectives, the investigative questions and the hypotheses should be identified. Each of them should be defined in operational terms pertinent to the measurement criteria or operations.

9. The significance of the study: It is important to point out the relevance and significance of the investigation. What would be the value of the findings of the study for policy formulation, theory or practice? Can the findings contribute to the enrichment of theory and/or to the solution of some practical problems? A careful statement of the value of the study and the possible application of its finding helps to justify its importance and social relevance.

10. Geographical area to be covered: The territorial area to be covered by the study should be decided and specified in the plan. The area to be chosen depends on the purpose of the study and time and other resources available.

11. Reference period: This period may be one year or two or more years depending on the nature of the study and availability of data. The period should be longer, say 5 or 10 years, if the study aims at making a trend analysis of an activity like production or sale or profitability.

12. Methodology: In this section, the overall typology of the design - experimental, descriptive, survey, case study or historical study - is specified. Further the methods or methods to be adopted for collection of data - observation, interviewing or mailing - are specified.

13. Sampling plan: If the study requires collection of primary data from the field, the universe must be delineated, and the methods of sampling to be used for drawing the sample from the universe and the sample size must be stated.

14. Tools for gathering data: In this section, the tools, to be used for gathering data - interview schedule/guide or questionnaire or check list, etc. - are listed and each of them is described. The tools chosen should be appropriate to the methods to be adopted for gathering data.

15. Plan of analysis: The statistical techniques to be used for analyzing the various techniques should be specified. The application of appropriate techniques is essential for testing hypothesis and drawing inferences.

16. Chapter scheme: The chapter scheme of the report/dissertation to be prepared for communicating the findings of the study to the academic community and the users should be outlined and the purpose of each chapter should be stated.

17. Time budget: The time period required for each stage of work and the total time duration of the study are specified. This budget may be presented in the following format:

Stages	*Time Period*
1. Initial review of literature and the selection of the problem.	xxxxx
2. Formulation of the selected problem and the preparation of the research plan	xxxxx
3. Construction of tools and pre-testing	xxxxx
4. Field work experimentation and collection of data	xxxxx
5. Processing and analysis of data	xxxxx
6. Planning and report-writing work	xxxxx
7. Drafting and finalizing the report	xxxxx
	xxxxx

(*Note:* The review of literature relevant to the research problem should be continued till the report is drafted).

18. Financial budget: This should include as estimate of the expected costs of the project under various major categories like salary (if any), printing and stationary, postage, travel expenses, computation, secretarial and typing etc.

This research plan with modifications made at the implementation stage and a description of the experiences of fieldwork will form part of the report under the title "The Design of the Study."

The principles or conditions required for an experimental study may be identified. They are:

1. It should be possible for selecting exactly *identical* groups. This possibility exists in physical and natural sciences, but not so in social sciences, which deal with human life. It is difficult to find exactly identical groups of persons. We may get approximately similar groups only.
2. The target groups should be amenable for experimentation. This is ensured in physical sciences. But human beings may not always be willing to be subject to experimentation.
3. It should be possible to *identify* all the *independent variables* that affect the dependent variables under study. This again is ensured in physical sciences, but not in social phenomena, as our knowledge of human mind and behaviour is limited.
4. It should be possible to *keep non-experimental variables* constant so as to study the effect of experimental variables on the phenomenon. Such close controls over the subject variables are possible in laboratory experimentation. But they are almost impossible in human life situations, which are dynamic and complex. Thus, strictly controlled experimentation is rarely feasible with human beings.

Nevertheless, useful and fairly valid experimental research is possible in several areas of social sciences such as economic development, welfare programmes, social education, teaching technology, political administration, industrial and agricultural finance, management of enterprises and institutions and so on.

QUESTIONS

Section A

1. *What is meant by research Design.*
2. *Mention any two features of a good research Design.*
3. *List the contents of Research Design.*
4. *Mention the significance of review of literature.*
5. *What is Hypothesis?*

6. *Define the term' Objective'.*
7. *Mention any two principles of research Design.*
8. *Define the term ' Operational Definition'.*
9. *What is meant by ' feasibility'.*
10. *Define the term ' Researchability'.*
11. *Give the meaning of concrete concepts & abstract concepts?*

Section B

1. *Assess the role of Hypothesis in making research Design.*
2. *Could there be a Stereo-type research Design for all studies.*
3. *What is meant by experimental design? What are its characteristic features.*
4. *Analyse the different classifications of Research Design.*
5. *"Research Design' is a complex concept. Analyse.*
6. *State the features of concepts?*
7. *What is operation Defination? What are Definition criteria for operational definition.*
8. *What is Research Design? What are essentials of good research design?*
9. *"A Research without pre-drawn plan is like ocean voyage without marinals substantiate?*
10. *Highlight the importance of research plan?*

Section C

1. *Give a brief critical review of literature in the field of research work.*
2. *Explain the different components of research Design.*
3. *Write a Analytical note on problems in defining concepts?*
4. *Write the steps in operationalisation of concepts?*
5. *Discuss about contents of Research design.*

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CHAPTER - 4

SAMPLING

Sampling-Meaning- Need-Census and Sample survey sampling design-Probability-Sampling (Simple Random-Systamatic- Startified Cluster-Area Multi-Stage- Sequestional sampling methods)

INTRODUCTION

Concept

Empirical field studies require collection of first-hand information or data pertaining to the units of study from the field. The units of study may include geographical areas like districts, talukas, cities or villages which are covered by the study, or institutions or households about which information is required, or persons from whom information is required, or persons from whom information is available. The *aggregate* of all the units pertaining to a study is called the *population* or the universe. Population is the target group to be studied.

It is the aggregate of elements about which we wish to make inferences. A member of the population is an element. It is the subject on which measurement is taken. It is the *unit of study*. A part of the population is known as a sample. The process of drawing a sample from a larger population is called sampling. The list of sampling units from which a sample is taken is called the *sampling frame*, e.g., a map, a telephone directory, a list of industrial undertakings, a list of car licensees etc.

Illustration 1: A researcher desires to study the attitude of students of Master of Education of a college of education towards semester system. A

student of that course is a unit of study. The total of all Master Education student of that course is a unit of study. The list of M.Ed. student from which a sample will be drawn is the sampling frame.

Illustration 2: A researcher wants to survey the brand preferences of households regarding toilet soaps in Jayanagar area of the city of Bangalore. A household is the sampling unit. The total of all households in Jayanagar area is the population. Suppose in a detailed map of Jayanagar, but list of households is not available, each block may be considered a sampling unit. A list of such blocks will be used as the frame.

Aims of Sampling

Well-selected sampling may reflect fairly accurately the characteristics of the population. For example, with a survey of a sample of voters, one can predict the voting intentions of millions of voters. A specified value of the population, such as average of variance is named *parameter;* the corresponding value in the sample is termed a *statistic.* The *chief aim* of sampling is to *make an inference* about an unknown parameter from a measurable sample statistic.

A second aim of sampling is to *test a statistical hypothesis* relating to population. A sample is drawn and the data collected from the sample informants are analysed and on the basis of the result the hypothesis may be accepted or rejected.

Census Vs. Sampling

The process of designing a field study, among other things, involves a decision to use sampling or not. The researcher must decide whether he should cover all the units or a sample of units. When all the units are studied, such a complete coverage is called a *census survey.* When only a sample of the universe is studied, the study is called a *sample survey.*

In making this decision of census or sampling, the following factors are considered:

1. ***The size of the population:*** If the population to be studied is relatively small, say 50 institutions or 200 employees or 150 households, the investigator may decide to study the entire population. The task is easily manageable and the sampling may not be required. But if the population to be studied is quite large, sampling is warranted. However, the size is a *relative* matter. Whether a population is large or small depends upon the nature of the study, the purpose for which it is undertaken, and the *time and other resources* available for it.

2. ***Amount of funds budgeted for the study:*** The decision regarding census or sampling depends upon the budget of the study. Sampling is opted when the amount of money budgeted is smaller than the anticipated cost of census survey.

3. ***Facilities:*** The extent of facilities available- staff, access to computer facility and accessibility to population elements- is another factor to be considered in deciding to sample or not. When the availability of these facilities is extensive, census survey may be manageable. Other wise, sampling is preferable.

4. ***Time:*** The time limit within which the study should be completed is another important factor to be considered in deciding the question of census or sample survey. This, in fact, is a primary reason for using sampling by academic and marketing researchers.

Characteristics of Good Sample

Whether the result obtained from a sample survey would be accurate or not depends upon the quality of the sample. The characteristics of a good sample are described below.

1. ***Representativeness:*** A sample must be representative of the population. Probability sampling technique yield representative sample. In measurement terms, the sample must be valid. The validity of a sample depends upon its accuracy and precision.

2. ***Accuracy:*** Accuracy is defined as the degree to which bias is absent from the sample. An accurate (unbiased) sample is one which exactly represents the population. It is free from any influence that causes any difference between sample value and population value (say, average).

3. ***Precision:*** The sample must yield precise estimate. Precision is measured by the standard error or standard deviation of the sample estimate. The smaller the standard error or estimate, the higher is the precision of the sample.

4. ***Size:*** A good sample must be adequate in size in order to be reliable. The sample should be of such size that the inferences drawn from the sample are accurate to the given level of confidence.

Basis of Sampling

Sampling is based on two premises. They are:

1. There is such similarity among the elements in a population that a few of these elements will adequately represent the characteristics

of the total population. For example, the attitudes of postgraduate students towards the examination system can be gauged by studying the attitudes of a few representative postgraduate students in a university.

2. While the sample value (statistic) or some sample units may be more than the population value (parameter), the sample value of other sample units may be less than the population value. When the sample is drawn properly these differences tend to counteract each other. With the result, a sample value is generally close to the population value.

Thanks to these tendencies, sampling yields almost the same result as that of a census survey.

Advantages of Sampling

Why is sampling used? What are its advantages? The advantages of sampling are many.

First, sampling *reduces* the *time* and *cost* of research studies. Thanks to the use of sampling, it has become possible to undertake even national or global studies at a reasonable cost and time. Such economy in time and cost improves the viability of several field studies like credit surveys, poverty surveys and marketing surveys.

Second, sampling *saves labour*. A smaller staff is required both for fieldwork and for processing and analyzing the data.

Third, the *quality* of a study is often *better* with sampling than with a complete coverage. The possibility of better interviewing, more thorough investigation of missing, wrong or suspicious information, better supervision, and better processing is greater in sampling than in complete coverage.[1] No wonder that the accuracy of decennial population censuses in USA, India and other countries is checked by making sample surveys.

Fourth, sampling *provides* much *quicker results* than does a census. The speed of execution minimizes the time between the recognition of a need for information and the availability of that information. The speed of execution is vital in feasibility studies, evaluation studies and business research. Timely execution of a study is essential for making use of its findings.

Fifth, sampling is the *only procedure possible*, if the population is infinite, e.g., throws of dice, consumer behaviour surveys, etc.

Last, statistical sampling yields a crucial advantage over any other way of choosing a part of the population for a study. That is, when the estimates of the population characteristics are made from the sample results, the precision of these estimates can also be *gauged from the sample results* themselves.

Limitations of Sampling

Sampling is, however, not free from limitations.

1. Sampling demands a *through knowledge of sampling methods* and procedures and an exercise of *greater care;* otherwise the results obtained may be incorrect or misleading.
2. When the *characteristic* to be measured occurs only rarely in the population, a very large sample is required to secure units that will give reliable information about it. A large sample has all the drawbacks of a census survey.
3. A *complicated sampling* plan may require *more labour* than a complete coverage.
4. It may not be possible to ensure the representativeness of the sample, even by the most perfect sampling procedures. Therefore sampling results in a certain degree of sampling errors, i.e., there will be some difference between the sample value and the population value.

SAMPLING TECHNIQUES OR METHODS

Classification

Sampling techniques or methods may be classified into two generic types: (a) Probability or Random Sampling, and (b) Non-probability or Non-random Sampling.

Probability sampling is of following types:

1. Simple random sampling
2. Stratified random sampling
3. Systematic random sampling
4. Cluster sampling
5. Area sampling
6. Multi-stage and sub-sampling
7. Random sampling with probability proportional to size
8. Double sampling and Multiphase sampling
9. Replicated or interpenetrating sampling.

Non-probability sampling may be classified into:

1. Convenience or accidental sampling
2. Purposive (or Judgement) sampling
3. Quota sampling
4. Snow-ball sampling

SAMPLING METHODS

Probability Sampling	*Non-Probability Sampling*
A. Simple designs	
– Simple random sampling	Convenience or accidental sampling
– Stratified random sampling	
– Systematic random sampling	Purposive or judgement sampling
B. Complex design	
– Cluster and area sampling	Quota sampling
– Multi-stage and sub-sampling	Snow-ball sampling
– Probability proportional to size sampling	
– Double sampling and Multi-phase sampling	
– Replicated sampling	

Exhibit : Sampling Methods

Each of the above sampling methods is discussed separately in subsequent pages.

Probability Vs. Non-Probability Sampling

Probability sampling is based on the theory of probability. It is also known as *random sampling*. It provides a known non-zero chance of selection for each population element.

Its characteristics are:

1. In probability sampling every population has a *chance* of being selected.
2. Such chance is a *known* probability. For instance, if a sampling frame is a list of 100 students of a specific course of study, in a simple random sample, each student has $1/100^{th}$ chance of being selected.
3. Probability sampling yields a *representative* sample, and hence the findings of the sample survey are generalisable to the population.
4. The closeness of a sample to the population can be determined by estimating sampling bias or error. Through randomization, the danger

of unknown sampling bias can be minimized. Hence, probability sampling is preferable to non-probability sampling.

Probability sampling should be used when generalization is the objective of study, and a greater degree of accuracy of estimation of population parameters is required. Cost and time required for probability sampling may be large. Hence, the benefit derived from it should justify the cost.

Non-probability sampling or non-random sampling is not based on the theory of probability. This sampling does not provide a chance of selection to each population element. The only merits of this type of sampling are simplicity, convenience and low cost.

Its merits are:

1. It does not ensure a selection chance to each population unit.
2. The selection probability is unknown.
3. A non-probability sample may not be a representative one.
4. Non-probability sampling plan does not perform inferential function, i.e., the population parameters cannot be estimated from the sample values.
5. It suffers from sampling bias, which will distort results.

Therefore, non-random is not a desirable method. Yet there are some practical reasons for using it. Those reasons are:

1. When there is no other feasible alternative due to non-availability of a list of population, non-availability of some population elements for collection of data, etc;
2. When the study does not aim at generalizing the findings to the population, but simply at feeling the range of conditions, or nature of the phenomenon;
3. When the cost required for probability sampling may be too large, and the benefit expected from it is not commensurate with such costs; and
4. When probability sampling requires more time, but the time constraints and the time limit for completing the study do not permit it.

PROBABILITY SAMPLING METHODS

Random Sampling Procedures

The importance of randomness in sampling needs no emphasis. It is a means for securing a representative sample. How can a random sample be drawn? The layman tends to think that random sampling means picking out units "at random", i.e., in a haphazard or hit-and-miss way. Experience shows that the human being is an extremely poor instrument for the conduct of a random selection. To ensure true randomness the method of *selection* must be *independent of human judgement*. There are three basic procedures.

1. The lottery method: This is the simplest and most familiar procedure of random sampling. If a sample of 10 students is to be drawn out of a list of 50 students in a section, take 50 equal size chips or slips of paper; number them from 1 to 50 each bearing only one number. Roll each slip. Put the rolled slips in a global container and thoroughly shuffle or mix them. Take 10 chips from the container one after another. Each time before drawing a chip, mix the chips in the container thoroughly. The units bearing the numbers of chips drawn constitute the random sample.

Lottery method is useful for drawing a small sample from a small population. But it would be time consuming and tedious if the population is very large.

2. The use of table of random numbers: This is a less cumbersome, but equally valid procedure of sample selection. Tables of random numbers have been developed by Kendall and Smith (1939), Fisher and Yates (1963) and Tippett (1927). One of them is usually found in a standard book on Statistics or Methodology of Research. To select a random sample out of a given frame, one should simply start to read numbers from a Table of Random Numbers at any randomly selected point and pick out numbers within the range of the frame. This procedure is illustrated below.

Let us suppose that random sample of 50 is to be selected from a college population of 500 commerce students. We can use any table of Random Numbers.

EXTRACT FROM A TABLE OF RANDOM NUMBERS

	10	09	73	25	33	76
52	01					
	37	54	20	48	05	64
89	47					
	08	42	26	89	53	19
64	50					

	09	01	90	25	29	09
37	67					
	12	80	79	99	70	80
15	73					
	66	06	57	47	17	34
07	27					
	31	06	01	08	05	45
57	18					
	85	26	97	76	02	02
05	16					
	63	57	33	21	35	05
32	54					
	73	79	64	57	53	03
52	96					

Exhibit : Sample of Random Numbers

Let us suppose, we start at the top of the left hand second column. As the population consists of a three-digit figure, read three-digit columns, i.e., read 097, 542, 422, 019 and so on. All the numbers within the range of 1 to 500 may be picked out. Then the sample will consist of:

097, 422, 019, 065, 060, 269 and so on. In the above reading, 542, 807, 573, etc. are rejected because they are over 500.

When the researcher reaches the bottom of a column, he can simply move one digit to the right and start at the top of the column again, and read numbers in three-digits: 973, 420, 226, 190, 079 and so on.

The main advantages of the use of a Table of Random Numbers are:

Easy to use and ready accessibility.

The Table of Random Numbers is ideal for obtaining a random sample from relatively small populations. When populations are quite large say lakhs or crores, drawing numbers from the table becomes tedious.

3. Use of computer: If the population is very large and if computer facilities are available, a computer may be used for drawing a random sample. The computer can be programmed to print out a series of random numbers as the researcher desires.

1. Simple Random Sampling

This sampling technique gives each element an equal and independent chance of being selected. An *equal chance* means *equal probability* of selection, e.g., in a population of 300, each element theoretically has $1/300^{th}$ chance of

being selected. In a population of 1000, each element has $1/1000^{th}$ chance of being selected. Equal probability selection method is described as Epsem sampling. An *independent chance* means that the draw of one element will not affect the chances of other elements being selected.

Where some elements are purposely excluded from the sample, the resulting sample is not a random one. Hence, all elements should be included in the sample frame to draw a random sample.

Procedure: The procedure of drawing a simple random sample consists of:

- ❖ Enumeration of all elements in the population,
- ❖ Preparation of a list of all elements, giving them numbers in a serial order 1, 2, 3... so on, and
- ❖ Drawing sample numbers by using (a) Lottery method, (b) a table of random numbers or (c) a computer.

Suitability: The simple random sampling is suitable only for a small homogeneous population. It may yield a representative sample under the following conditions:

(1) Where the population is a *homogeneous group* with reference to the specified characteristics, e.g., students studying in fifth standard in a boys school form a homogeneous group as regards level of education and age group;

(2) Where the population is relatively small; and

(3) Where a complete list of all elements is available or can be prepared.

The simple random sampling is not suitable for drawing a sample from a large heterogeneous population; as it may not yield a representative sample of such population.

Advantages: Some advantages of simple random sampling are:

(1) All elements in the population have an equal chance of being selected.

(2) Of all the probability sampling techniques, simple random sampling is the easiest to apply.

(3) It is the most simple type of probability sampling to understand.

(4) It does not require a prior knowledge of the true composition of the population.

(5) The amount of sampling error associated with any sample drawn can easily be computed.

Disadvantages: The simple random sampling techniques suffers from certain drawbacks.

(1) It is often impractical, because of non-availability of population list, or of difficulty in enumerating the population. For example, it is difficult to get a current accurate list of households in a city or a list of landless rural agricultural labourers who migrate from area to area in search of employment or a list of households of a nomadic tribe.

(2) The use of simple random sampling may be wasteful because we fail to use all of the known information about the population.

(3) This technique does not ensure proportionate representation to various groups constituting the population.

(4) The sampling error in this sampling is greater than that in other probability samples of the same size, because it is less precise than other methods.

(5) The size of the sample required to ensure its representativeness is usually larger under this type of sampling than under other random sampling techniques.

(6) A simple random design may be expensive in time and money.

These problems have led to the development of alternative superior random sampling designs like stratified random sampling, systematic sampling, etc.

2. Stratified Random Sampling

This is an improved type of random or probability sampling. In this method, the population is sub-divided into homogeneous groups or strata, and from each stratum, random sample is drawn. For example, university students may be dividend on the basis of discipline, and each discipline group may again be divided into juniors and seniors; and the employees of a business undertaking may be divided into managers and non-managers and each of those two groups may be sub-divided into salary -grade-wise strata.

Need for stratification: Stratification is necessary for (1) increasing a sample's statistical efficiency, (2) providing adequate data for analyzing the

various sub-populations, and (3) applying different methods to different strata.[2]

Stratification ensures representation to all relevant sub-groups of the population. It is thus more efficient statistically than simple random sampling.

Stratification is essential when the researcher wants to study the characteristics of population sub-groups, e.g., male and female employees of an organisation.

Stratification is also useful when different methods of data collection, etc. are used for different parts of the population, e.g., interviewing for workers and self-administered questionnaire for executives.

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

Stratification process: This involves three major decisions:

(1) The stratification base or bases to be used should be decided. The ideal base would be the principal variable under study. For example, if the size of firms is a primary variable, the firms may be stratified on the basis of the block capital employed.

(2) The number of strata: What should be the number of strata? There is no precise answer to this question. Larger the number of strata, greater may be the degree of representativeness of the sample. The decision may be based on the number of sub-population groups to be studied and the cost of stratification. Cochran[3] suggests that there is little to be gained in estimating overall population values when the number of strata exceeds six.

(3) Strata sample sizes: There are two alternatives. First, the strata sample sizes may be proportionate to strata's shares in the total population. Second, they may be disproportionate to strata's shares. Accordingly stratified random sampling may be classified into (a) Proportionate stratified sampling and (b) Disproportionate stratified sampling.

Proportionate Stratified Sampling

This sampling involves drawing a sample from each stratum in proportion to the latter's share in the total population. For example, if the final year MBA students of the Management Faculty of a university consist of the following specialization groups:

Specialization stream	*No. of Students*	*Proportion of each stream*
Production	40	0.4
Finance	20	0.2
Marketing	30	0.3
Rural Development	10	0.1
	100	1.0

The researcher wants to draw an overall sample of 30. Then the strata sample sizes would be:

Strata	*Sample size*		
Production	30 × 0.4	=	12
Finance	30 × 0.2	=	6
Marketing	30 × 0.3	=	9
Rural Development	30 × 0.1	=	3
			30

Thus, proportionate sampling gives proper representation to each stratum and its statistical efficiency is generally higher. This method is, therefore, very popular.

Advantages: The principal advantages of proportionate stratified sampling are:

(1) It enhances the representativeness of the sample by giving proper representation to all sub-groups in the population.

(2) It gives higher statistical efficiency than that given by simple random sampling for a given sample size.

(3) It is easy to carry out this sample method.

(4) This method gives a self-weighing sample, the population mean can be estimated simply by calculating the sample mean.

Disadvantages: The drawbacks of the proportionate stratified random sampling are:

(1) A prior knowledge of the composition of the population and the distribution of the population characteristics are required to adopt this method.

(2) This method is very expensive in time and money. Of course its greater efficiency may offset the additional cost.

(3) The identification of the strata might lead to classification errors.

Some elements may be included into the wrong strata. This may vitiate the interpretation of survey results.

Disproportionate Stratified Random Sampling

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

The desirability of disproportionate sampling is usually determined by three factors, viz., (a) the sizes of strata, (b) internal variances among strata, and (c) sampling costs.

The guideline suggested by Cochran is:

In a given stratum, take a larger sample if

(a) the stratum is larger,

(b) the stratum is more variable internally, and

(c) sampling is cheaper in the stratum.

If the elements of a stratum are more mixed or variable, then it would be sensible to take a larger sample from it in order to make it representative of the stratum. Similarly, if the cost per sampling unit is expected to be greater in some strata than in others, one could increase the cost effectiveness by taking a less proportionate sample in the costlier strata.

Usage: This method of disproportionate sampling is not widely used. However, it is appropriate to use it under the following circumstances:

(1) When the population contains some small but important sub-groups.

(2) When certain sub-groups are quite heterogeneous, while others are homogeneous; and

(3) When it is expected that there will be appreciable differences in the response rates of the sub-groups in the population. But the above differences should be several-fold to make disproportionate sampling worthwhile.

Disproportionate sampling cannot be used for population with unknown proportions of characteristics, because correct sizes of strata samples cannot be determined.

Advantages: The major advantages of disproportionate sampling are:

(1) It is less time consuming compared with proportionate sampling, because the researcher is not necessarily concerned about the proportionate representativeness of his resulting sample as in the latter method.

(2) It facilitates giving appropriate weighing to particular groups, which are small but more important.

Disadvantages: The disadvantages of disproportionate sampling are:

(1) This method does not give each stratum proportionate representation. Hence, the resulting sample may be less representative.

(2) This method requires a prior knowledge of the composition of the population, which is not always possible.

(3) This method is also subject to classification errors. It is possible that the researcher may misclassify certain elements.

(4) Though disproportionate sampling is a means for developing an optimal Stratification scheme, its practical feasibility is doubtful because one generally does not know the relative variability in the strata nor the relative costs.

3. Systematic Sampling or Fixed Interval Method

Meaning and process: This method of sampling is an alternative to random sampling. It consists of taking every k^{th} item in the population after a random start with an item from 1 to k. For example, suppose it is desired to select a sample of 20 students, from a list of 300 students, divide the population total of 300 by 20, the quotient is 15. (if there is any fraction in the quotient ignore the fraction and take the integer or whole number). Select a number at random between 1 and 15, using lottery method or a table of random numbers. Suppose the selected number is 9. Then the students numbered 9, 24 (9+15), 39 (24+15), 54 (39+15), 69, 84 ... are selected as the sample.

As the interval between sample units is fixed, this method is also known as fixed interval method.

Applications: Systematic selection can be applied to various populations such as students in a class, houses in a street, telephone directory, customers of a bank, assembly line output in a factory, members of an association, and so on.

Strictly speaking, this method of sampling is not a probability sampling. It possesses characteristics of randomness and some nonprobability traits. Hence, it is sometimes called a *'pseudo-random'* sampling.

Real systematic sampling: It is more appropriate to use the label "systematic sampling" to the procedure of drawing a sample from a frame re-arranged in a systematic order on the basis of the population's important characteristic, e.g., arranging the farm households in a village in an ascending or descending order of the size of their farms. Such systematic re-arrangement of the frame is desirable for populations with greater variability. In such a case, even stratification cannot give proper representation to all size groups. For example, for a farm management study, the farm size is a primary variable. Suppose the size of farms of farmers in the area covered by the study varies widely ranging from 0.2 hectare to 25 hectares. Even if they are stratified into 5 strata, viz., (1) upto 5 hectares, (2) 5 to 10 hectares, (3) 10 to 15 hectares, (4) 15 to 20 hectares and (5) 20 to 25 hectares, there are greater variations in each stratum. Thus, even stratified random sampling may not yield a good representative sample. But if the list of farmers is rearranged in ascending or descending order of their farm sizes, and a sample is drawn at regular intervals with a random start, all size groups get proper representation. Thus the degree of representativeness of this sample will be higher than that of a simple or stratified random sample of the same size.

Hence, it will be more appropriate to call this kind of interval sampling as systematic random sampling.

Advantages: The major advantages of systematic sampling are:

(1) It is much simpler than random sampling. It is easy to use.

(2) It is easy to instruct the field investigators to use this method.

(3) This method may require less time. A researcher operating on a limited time schedule will prefer this method.

(4) This method is cheaper than simple random sampling.

(5) It is easier to check whether every 'k'th has been included in the sample.

(6) Sample is spread evenly over the population.

(7) It is statistically more efficient than a simple random sample when population elements are ordered chronologically, by size, class, etc. Then systematic sampling gives a better representative sample.

Disadvantages: The primary disadvantages of systematic sampling are:

(1) This method ignores all elements between two 'k'th elements selected. Further, except the first element, other selected elements are not

chosen at random. Hence, this sampling cannot be considered to be a probability sampling in the strict sense term.

(2) As each element does not have an equal chance of being selected, the resulting sample is not a random one. For studies aiming at estimations or generalizations, this disadvantage would be a serious one.

(3) This method may sometimes give a biased sample. If by chance, several 'k'th elements chosen represent a particular group, that group would be over-representated in the sample.

4. Cluster Sampling

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

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

Suppose a researcher wants to select a random sample of 1,000 households out of 40,000 estimated households in a city for a survey. A direct sample of individual households would be difficult to select, because a list of households does not exist and would be too costly to prepare. Instead, he can select a random sample of a few blocks/wards. The number of blocks to be selected depends upon the average number of estimated households per block. Suppose the average number of households per block is 200, then 5 blocks comprise the sample. Since the number of households per block varies, the actual sample size depends on the block which happen to be selected. Alternatively, he can draw a sample of more blocks and from each sample blocks a certain number of households may be selected by systematic sampling.

Some illustrations of clusters are:

Population	*Elements*	*Cluster or Sampling units*
1. City	Households	Blocks
2. City	Individuals	Households

3. Affiliating University	Students	Affiliated Colleges
4. Rural areas	Households	Villages
5. Industrial areas	Industrial unit	Industrial estates

Features: What makes a desirable cluster depends on the survey's situation and resources. The individual elements are determined by the survey objectives. For example, for an opinion poll, the individual person is a population element, but for a socio-economic survey of households or a consumer behaviour survey, a household may be population element or unit of study. The cluster may be an institution or a geographical area or any other appropriate group depending on the nature of survey.

The number of elements in a cluster is called the cluster size. The clusters in most populations are of unequal size, e.g., dwellings in blocks, persons in household, employees in section, farm households in villages, etc. Clusters of equal size are often the result of planned conditions such as manufacturing, e.g., matches in match boxes, soap cakes in cases. They rarely exist in nature or society.

Cluster sampling vs. stratified sampling: How does cluster sampling compare with stratified sampling? There are certain differences between them.

Cluster sampling process: The process of cluster sampling involves the following steps:

1. Identify clusters: What can be appropriate clusters for a population? This depends on the nature of the study and the distribution of the population relating to it. The appropriate clusters may be area units (e.g., districts, talukas, villages, blocks of a city) or organizations/organizational units (e.g., schools, colleges, factories, sections in a school or departments in a factory).

2. Examine the nature of clusters: How homogeneous are the clusters? Clusters should not be homogeneous in internal characteristics. A sample drawn from such clusters cannot fully represent the overall population. Hence clusters should be constructed in a way as to increase intra-cluster variance. For example, contiguous villages/city blocks that contain different income/social groups may be combined into one cluster.

Should the clusters be of equal or unequal size? "The theory of clustering is that the means of sample clusters are unbiased estimates of the population mean."[9] This is generally true when clusters are equal. But natural clusters often vary. The effects of unequal size may be reduced by 1) combining small

clusters and splitting large clusters or 2) stratifying clusters by size and selecting clusters from each stratum.

3. Determine the number of stages: Shall we use single-stage or multistage clusters? This depends primarily on the geographical area of the study, the scale of the study, the size of the population and the consideration of costs. Depending on these factors, the following alternatives are possible:

(a) ***Single-stage sampling:*** Select clusters on a random basis and study all elements in each of the sample clusters.

(b) ***Two-stage sampling:*** Select clusters and then select elements from each selected cluster.

(c) ***Multi-stage sampling:*** Extend the above method to more stages. This is discussed in detail under a separate subsequent sub-heading *"Multi-stage Sampling"*, in this chapter itself.

Economy Vs. Accuracy: Cluster samples usually gives a less precise estimates than simple random samples of the same size because of social area tendencies toward homogeneity. Why then should cluster sampling be used? It is used simply because it cuts research costs and time. For example, it is simpler, more convenient and cheaper to randomly select 20 street with 30 average households each rather than to select 600 households ahead over an entire city. Interviewing units in small geographic areas is more convenient and less costly. One need not also waste lot of time in moving from one unit to another, because of their close special proximity. Thus, cluster sampling is economically more efficient in terms of time, cost and convenience.

However, the statistical efficiency to cluster samples is relatively low, because they may not fully be representative of the population.

Hence, we have to strike a balance between economic and statistical factors and consider the net relative efficiency in adopting the cluster sampling.

Applications: The applications of the cluster sampling in social science research are extensive, particularly in farm management surveys, socio-economic surveys, rural credit surveys, demographic studies, ecological studies, public opinion polls, large scale surveys of political and social behaviour, attitude surveys, and so on.

Advantages: The primary advantages of the cluster sampling method are:

(1) This method is much easier and more convenient to apply when large populations are studied or large geographical areas are covered. Even

a ready list of population elements is not necessary. A researcher can simply draw a random sample of geographical sections and adopt single or multistage sampling depending on the vastness of the area covered by the study.

(2) The cost of this method is much less when compared with other sampling methods.

(3) This method promotes the convenience of field work as it could be done in compact places.

(4) Sampling under this method does not require more time.

(5) Units of study can be readily substituted for other units within the same random section.

(6) This method is flexible. Where it involves multistage sampling, it is possible to employ different types of sampling in successive stages.

Disadvantages: This method has certain disadvantages. They are:

(1) The cluster sizes may vary and this variation could increase the bias of the resulting sample. For example, if the researcher were to interview all adults in households in each selected street the number of adults would vary from house to house. There would be certain bias resulting from the large coverage of big families.

(2) The sampling error in this method of sampling is greater. Thus, this method is statistically less efficient than other probability sampling methods.

(3) Adjacent units of study (e.g., households) tend to have more similar characteristics than do units distantly apart. This affects the 'representativeness' of the sample and this effect is reflected in a greater sampling error.

5. Area Sampling

This is an important form of cluster sampling. In larger field surveys, clusters consisting of specific geographical areas like districts, talukas, villages or blocks in a city are randomly drawn. As the geographical areas are selected as sampling units in such cases, their sampling is called area sampling. It is not a separate method of sampling, but forms part of cluster sampling.

In a country like India where a state (previously known as a province) is divided into districts, districts into talukas and talukas into towns and villages, areas sampling is done on the basis of these administrative units in multi-stages.

Illustration: Where the area covered by a study is a city, to draw a random sample of households, the following procedure may be adopted:

(1) Take a map of the concerned city and lay over it a transparent sheet with a grid system of lines (i.e., horizontal and vertical lines drawn at equal intervals).

(2) The grid system divides the city into squares of equal size, say 100 areas.

(3) Leave the squares occupied by non-residential business and public buildings, parks etc., – say 30 squares.

(4) Number the remaining squares in a serial order 1, 2, 3, 4, 5, ... 70 in a serpentine manner.

(5) Estimate the average number of households in each square on the basis of house counts in a few squares. Say the average number of households is 80.

(6) If the required sample of households is, say 640, determine the number of squares to be selected by dividing this total by 80, i.e., 8 squares.

(7) Select eight squares out of 80 on a simple random basis using a table of random numbers; or by adopting systematic random sampling method, i.e, every 10th (80/8 =10) square with a random start.

(8) Study all households in each of the sample eight squares. The total sample would be 8 × 80 = 640 or a little less or more.

Where different socio-economic class of households are found to be concentrated in specific areas of the city, it is desirable to stratify the areas on an identifiable basis, then

- ❖ Draw a random sample of proportionate number of areas from each strata.
- ❖ Prepare a list of households in each of the selected areas.
- ❖ Select randomly a proportionate number of households in each of these lists.

Alternatively divide each of the selected area into smaller areas of almost equal size called segments and select randomly a proportionate number of segments in each sample area and survey all households in each of the selected segments.

Area sampling invariably involves multi-stage sampling and sub-sampling. (See below).

6. Multi-stage Sampling

In this method, sampling is carried out in two or more stages. The population is regarded as being composed of a number of first stage sampling units. Each of them is made up of a number of second stage units and so forth. That is, at each stage, a sampling unit is a cluster of the sampling units of the subsequent stage. First, a sample of the first stage sampling units is drawn, then from each of the selected first stage sampling unit, a sample of the second stage sampling units is drawn. The procedure continues down to the final sampling units or population elements. Appropriate random sampling method is adopted at each stage.

Usage: Multi-stage sampling is appropriate where the population is scattered over a wider geographical area and no frame or list is available for sampling. It is also useful when a survey has to be made within a limited time and cost budget.

Advantages: The crucial advantages of multi-stage sampling are:

1. It results in concentration of fieldwork in compact small areas and consequently in a saving of time, labour and money.
2. It is more convenient, efficient and flexible than single-stage sampling.
3. It obviates the necessity of having a sampling frame covering the entire population.

Disadvantages: The major disadvantage of the multi-stage sampling is that the procedure of estimating sampling error and cost advantage is complicated. It is difficult for a non-statistician to follow this estimation procedure.

Sub-sampling

Sub-sampling is a part of a multi-stage sampling process. In multi-stage sampling, the sampling in second and subsequent stage frames is called sub-sampling. Suppose that from a population of 40,000 households in 800 streets of a city, we want to select a sample of about 400 households. We can select a sample of 400 individual households (elements) or a sample of 8 streets (cluster). The sample of 400 elements would be scattered over the city, but the cluster sample would be confined to 8 streets. Clustering reduces survey costs, but increases the sampling error. Sub-sampling balances these two conflicting effects of clustering. In the above case, first a sample of say 80 streets may be drawn and from each of the selected street a 10% sub sample

of households may be drawn. In each of the above stages, an appropriate probability sampling-simple random/stratified random sampling/systematic random sampling-may be adopted.

Control of Sampling Size

One of the problems of cluster sampling is the problem of greater inequality in cluster sizes. The total sample size is subject to large variation if it is based on a random selection of clusters that differ greatly in size. If we sub sample the selected clusters at a fixed rate, the total sample size of elements depends on which clusters are chosen at the first stage. With a large cluster of 10,000 a second-stage sampling fraction of 1/1000 gives a sample of 100 persons, while with a small cluster of 2,000 persons it yields only 20. The researcher needs to be able to fix the sample size within reasonable limits, therefore, the *uncontrolled random sampling* of clusters with *unequal sizes*, e.g., cities, blocks in big cities, districts, villages and establishments is *not suitable*.

Exact control of sample size is unnecessary and impossible in most situations. However, the least an approximate control is essential. The main reasons for controlling sample size are:

1. The sample should be of adequate size in order to get results of desired degree of precision.
2. The cost of data collection requires an upper limit on the overall sample size, and contractual obligation, if any, may also impose a lower limit.[4]
3. Large differences and fluctuations in the size of clusters cause administrative inefficiencies in the field work.
4. Statistical efficiency tends to suffer from large inequalities of sample clusters.[12] If the random sample of clusters includes one or two very large clusters containing mostly one social, ethnic group, the survey results would become biased.

For several such reasons a reasonable control over the sample size is needed. There are some ways to control and decrease variations in ultimate sample size viz.,

1. Stratification of clusters by size and selecting a random sample in each size-group;
2. Splitting and combining natural clusters to form artificial clusters of more or less equal size; or

3. Selecting clusters with probability proportional to size (PPS) either from the overall frame of clusters or from each size group of clusters.

7. Sampling with Probability Proportionate Size (PPS)

Illustration: Suppose the area of a survey is a State consisting of 20 districts. Out of them 4 districts are to be selected with PPS, the measure of size being population.

(a) List the district in some order and record the population of each together with cumulative population figures.

(b) Divide the cumulative total by 2: 310/2 = 155;

(c) Divide the list into two zones: 1-155; 156-310;

(d) Make a systematic random selection of two districts in each zone;

(e) Divide the first zone total by 2: 155/2 = 77. Draw a random number between 1 and 77, say, 66. The district 8 is the first sample.

TABLE

The Scheme for Selecting Districts with PPS

District	*Population (lakhs)*	*Cumulative population (lakhs)*
1	05	05
2	06	11
3	07	18
4	08	26
5	10	36
6	11	47
7	12	59
8	13	72
9	13	85
10	14	99
11	15	114
12	16	130
13	17	147
14	18	165
15	20	185
16	21	207
17	23	230
18	24	254
19	26	280
20	30	310

(f) Add the interval 77 to the random number of 66 to give 143, to locate 13 as the second;

(g) Add the interval 77 to 143 to give 220, to locate district 17 as the third sample; and

(h) Add the interval 77 to 220 to give 297, to locate 20 as the fourth sample.

8. Double (or Two-Phase) Sampling and Multi-Phase Sampling

Double (or Two-Phase) sampling "refers to the subsection of the final sample from a preselected larger sample, that provide information for improving the final selection."[13] When this procedure is extended to more than two phases of selection, it is then, called Multi-phase sampling. This is also known as Sequential Sampling, as sub-sampling is done from a main sample in phases. Additional information from sub samples of the full sample may be collected at the same time or later.

Multi-phase Vs. Multi-stage sampling

Multi-phase sampling is different from multi-stage sampling. "In multi-phase sampling, the different phases of observation relate to sample units of the same type while in multi-stage sampling, the sampling units are of different types at different stages."[5]

Usage: Double or multi-phase sampling is a compromise solution for a dilemma posed by undesirable extremes. "The statistics based on the sample of n can be improved by using ancillary information from a wide base: but this is too costly to obtain from the entire population of N elements. Instead, information is obtained from a larger preliminary sample n6 which includes the final sample n.[6] Multi-phase sampling is appropriate.

When it is more convenient and economical to collect certain items of general information on the whole of the units of a sample, and other items of special information from a sub-sample of cases possessing a given set of characteristics.

"The use of two phase sampling for the sole purpose of increasing the precision of sub-sample results is effective, only if the cost of data collection is considerably lower for members of the first phase sample than for members of the sub-sample-by a factor of atleast, say, ten."

9. Replicated or Interpenetrating Sampling

A real difficulty with complex sample designs like multi-stage stratified sampling is the laboriousness of the sampling error calculations. The case of these calculations is a factor to be taken into account in designing of a sample plan. One approach to simplify the procedure of computing sampling errors is replicated or interpenetrating sampling, which Deming[17] discusses in full, with a number of illustrations.

Replicated or Interpenetrating sampling involves selection of a certain number of sub-samples rather than one full sample from a population. All the sub-samples should be drawn using the same sampling technique and each is a self-contained and adequate sample of the population.

Replicated or Interpenetrating sampling can be used with any basic sampling technique: simple or stratified, single or multi-stage or single or multi-phase sampling.

For example, in order to study the views of postgraduates students of a university on semester system a random sample of 300 students (out of a total population of 3,000 students distributed over different disciplines like Economics, Sociology, Statistics, Mathematics, Management etc.,) is to be drawn, adopting discipline-based stratified sampling.

Instead of selecting one full sample of 300 students, two sub-samples of 150 each, or five sub-samples of each may be selected. The latter procedure is replicated sampling.

Whatever may be the number and size of sub-samples, each sub-sample has to be an independent sample with the same sampling method, and must be a sample covering the complete population.

Each sub-sample may be allocated to one individual investigator or a team of investigators.

Sample errors estimates can be calculated for each of the sub-samples, and the variation between these estimates provide a means of assessing the precision of the overall estimate.

A decision to be made is the number of sub-samples to be drawn. The number may vary between 4 to 10. Mahalanobis[7] often used four replications. If it is desired to obtain simple estimates of sampling errors, more replications are desirable. For this purpose, Deming has made wide use of ten replications.

Advantages: The major advantages of Replicated or Interpenetrating sampling are:

1. It provides a simple means of calculating the sampling error.
2. It is practical. If the size of the total sample is too large to get the results ready in time, one or more of the replications can be used to get the advance results.
3. The replicated sample can throw light on variable non-sampling errors (See Section 6.5 of this chapter). If each of the sub-sample is interviewed by a different or set of interviewers, an estimation of inter-viewer variation can be obtained.

Disadvantages: A disadvantage of replicated sampling is that it limits the amount of stratification that can be employed. This limitation is a real drawback to the use of replicated sampling in a multi-stage sampling plan.

NON-PROBABILITY SAMPLING METHODS

Introduction

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

- ❖ Convenience sampling
- ❖ Purposive (or Judgement) sampling
- ❖ Quota sampling
- ❖ Accidental sampling
- ❖ Snow-ball sampling

1. Convenience or Accidental Sampling

This is non-probability sampling. It means selecting sample units in a just 'hit and miss' fashion, e.g., interviewing people whom we happen to meet. This sampling also means selecting whatever sampling units are conveniently available, e.g., a teacher may select students in his class.

This method is also known as accidental sampling because the respondents whom the researcher meets accidently are included in the sample.

Usefulness: Though convenience sampling has no status, it may be used for simple purpose such as testing ideas or gaining ideas or rough impression about a subject of interest. It lays a groundwork for a subsequent probability sampling. Sometimes it may have to be necessarily used. For example, when a population cannot be defined or a list of population is not available, there is no other alternative than to use convenient sampling.

Advantages:

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

Disadvantages:

1. Convenience sampling is highly biased, because of the researcher's subjectivity, and so it does not yield a representative sample.
2. It is the least reliable sampling method. There is no way of estimating the representativeness of the sample.
3. The findings cannot be generalized.

2. Purposive or Judgement Sampling

This method means deliberate selection of sample units that conform to some pre-determined criteria. This is also known as Judgement sampling. This involves selection of cases which we judge as the most appropriate ones for the given study. It is based on the judgement of the researcher or some expert. It does not aim at securing a cross section of a population.

The chance that a particular case be selected for the sample depends on the subjective judgement of the researcher. For example, a researcher may deliberately choose industrial undertakings in which quality circles are believed to be functioning successfully and undertakings in which quality circles are believed to be a total failure.

Application: The method is appropriate when what is important is the typicality and specific relevance of the sampling units to the study and not their overall representativeness to the population.

Advantages: The advantages of purposive or judgement sampling are:

1. It is less costly and more convenient.
2. It guarantees inclusion of relevant elements in the sample. Probability sampling plans cannot give such guarantee.

Disadvantages: The demerits of judgement sampling are:

1. This does not ensure the representativeness of the sample.
2. This is less efficient for generalizing when compared with random sampling.
3. This method requires more prior extensive information about the

population one studies. Without such information, it is not possible to adjudge the suitability of the sample items to be selected.

4. This method does not lend itself for using inferential statistics, because, this sampling does not satisfy the underlying assumption of randomness.

3. Quota Sampling

This is a form of convenient sampling involving selection of quota groups of accessible sampling units by traits such as sex, age, social class, etc. when the population is known to consist of various categories by sex, age, religion, social class etc., in specific proportions, each investigator may be given an assignment of quota groups specified by the pre-determined traits in specific proportions. He can then select accessible persons, belonging to those quota groups in the area assigned to him.

"Quota Sampling is therefore a method of stratified sampling in which selection within strata is non-random. It is this Non-random element that constitutes its greatest weakness."[19]

Quotas are stratified by such variables as sex, age, social class and religion. It is easy to classify the accessible respondents under sex, age and religion, but it is very difficult to classify them into social categories, since social class usually involves a combination of factors such as occupation, income and caste and the interviewer's subjective judgement and bias play some role in the social class classification of respondents.

4. Snowball Sampling

This is the colourful name for a technique of building up a list or a sample of a special population by using an initial set of its members as informants. For example, if a researcher wants to study the problem faced by Indians through some source like Indian Embassy. Then he can ask each one of them to supply names of other Indians known to them, and continue this procedure until he gets an exhaustive list from which he can draw a sample or make a census survey.

This sampling technique may also be used in socio-metric studies. For example, the members of a social group may be asked to name the persons with whom they have social contacts, each one of the persons so named may also be asked to do so, and so on. The researcher may thus get a constellation of associates and analyse it.

Advantages: The advantages of snowball sampling are:

1. It is very useful in studying social groups, informal group in a formal organization, and diffusion of information among professionals of various kinds.
2. It is useful for smaller populations for which no frames are readily available.

Disadvantages:

1. The major disadvantages of snowball sampling is that it does not allow the use of probability statistical methods. Elements included are dependent on the subjective choice of the original selected respondents.
2. It is difficult to apply this method when the population is large.
3. It does not ensure the inclusion of all elements in the list.

SAMPLE DESIGN AND CHOICE OF SAMPLING TECHNIQUE

Sample Design

Sample design is a plan for drawing a sample from a population. This is an important part of a research design or plan. The preparation of a sample design involves making decisions on the following questions:

1. What is the relevant population?
2. What method of sampling frame shall we use?
3. What sampling frame shall we use?
4. What are the parameters of interest?
5. What should be the sample size?
6. How much will be the sample cost?

Relevant Population

The population relevant to a survey depends upon the research problem, the objectives of study, the geographical area selected for the survey, and the operational definition of the unit of study.

Sampling Frame

This is the list of population elements from which the sample is drawn. Ideally it should be a complete and correct list of population elements only.

In practice, the sampling frame available may not meet the requirements of the survey. It may suffer from some shortcomings, giving rise to frame problems. In Kish's classification,[8] there are four basic kinds of frame problems. They are:

The first is the problem of non-coverage and incomplete frame. For example, the voters list in a graduates constituency may not contain the names of all eligible graduates due to non-registration by some graduates; the payroll list of a firm may not contain the names of newly recruited employees.

Criteria for Selecting Sampling Techniques

1. Purpose of the survey: What does the researcher aim at? If he intends to generalize the findings based on the sample survey to the population, then an appropriate probability sampling method must be selected. The choice of a particular type of probability sampling depends on the geographical area of the survey and the size and nature of the population under study.

On the other hand, if he is interested in just understanding the nature of the phenomenon under study, and does not aim at generalizing his finding, some non-probability sampling method will suffice.

2. Measurability: The application of statistical inference theory requires computation of the sampling error from the sample itself. Probability samples only allow such computation. Hence, where the research objective requires statistical inference, the sample should be drawn by applying simple random sampling method or stratified random sampling method, depending on whether the population is homogeneous or heterogeneous. All probability samples are non-measurable, e.g., selecting a single cluster, a systematic sampling from a population with periodic variation, and cluster sampling in which the primary clusters are not identified.

3. Degree of precision: Should the results of the survey be very precise, or even rough results could serve the purpose? The desired level of precision is one of the criteria of sampling method selection. Where a high degree of precision of results would serve the purpose (e.g., marketing surveys) any convenient non-random sampling like quota sampling would be enough.

4. Information about population: How much information is available about the population to be studied ? Where no lists of population and no information about its nature are available, it is difficult to apply a probability sampling method.

Then exploratory study with non-probability sampling may be made to gain a better idea of the population. After gaining sufficient knowledge about the populations through the exploratory study, appropriate probability sampling design may be adopted.

5. The Nature of the population: In terms of the variables to be studied, is the population homogeneous or heterogeneous? In the case of a homogeneous population, even a simple random sampling will give a representative sample. If the population is heterogeneous, stratified random sampling is appropriate. "Systematic sampling would, however, be preferred in those cases where the list of units of population is available or easily obtainable and where there is no periodic variation or trend present in the population."[9]

6. Geographical area of the study and the size of the population: If the area covered by a survey is very large (e.g., a country or a state) and the size of the population is quite large, multi-stage cluster sampling would be appropriate. But if the area and the size of the population are small, single stage probability sampling methods could be used.

7. Financial resources: Is the available finance a limiting factor or not? If the available finance is limited, it may become necessary to choose a less costly sampling plan like multistage cluster sampling or even quota sampling as a compromise. However, if the objectives of the study and the desired level of precision cannot be attained within the stipulated budget, there is no alternative than to give up the proposed survey. Where finance is not a constraint, a researcher can choose the most appropriate method of sampling that fits the research objective and the nature of population.

8. Time limitation: The time limit within which the research project should be completed restricts the choice of a sampling method. Then, as a compromise, it may become necessary to choose less time consuming methods like simple random sampling instead of stratified sampling/sampling with probability proportional to size; multi-stage cluster sampling instead of single-stage sampling of elements. Of course, the precision has to be sacrificed to some extent.

9. Economy should be another criterion in choosing the sampling method. It means achieving the desired level of precision at minimum cost. "A sample is economical if the precision per unit cost is high or the cost per unit of variance is low." The precisions and costs of various measurable probability

sampling methods can be compared and the method which achieves the optimal balance between reliability of results and costs may be selected. This calls for much thought and ingenuity.

The above criteria frequently conflict and the researcher must balance and bend them to obtain a good sampling plan. The chosen plan thus represents an adaptation of the sampling theory to the available facilities and resources. That is, it represents a compromise between idealism and feasibility. One should use simple workable methods instead of unduly elaborate and complicated techniques.

QUESTIONS

Section A

1. *What is Sampling?*
2. *Mention any two uses of Sampling?*
3. *Mention any two characteristics of 'Good Sample'?*
4. *What is meant by 'representativeness' of a Sample?*
5. *What is meant by lottery method.*
6. *Mention any two limitations of Sampling.*
7. *Define Cluster Sampling?*
8. *How is a simple random sampling done?*
9. *Define the term ' Census'.*
10. *Why sampling is used?*

Section B

1. *How is the size of a sample for a study determined.*
2. *Analyse the limitations of sampling.*
3. *Differentiate between probability and non probability sampling.*
4. *Analyse the merits of stratified random sampling.*
5. *Analyze the relevance of 'Sampling frame'.*

Section C

1. *Discuss the merits and demerits of Quota Sampling.*
2. *Explain the different methods of sampling.*

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CHAPTER - 5

DATA COLLECTION AND PROCESSING

Data Collection and Processing - Collection of Primary data - Collection of data through quetionnaire and schedules secondary data- Qualitative techniques of data collection- Interview- objectives Tanslationof data.

MEANING AND IMPORTANCE OF DATA

Meaning of Data

The search for answers to research questions is called collection of data. Data are facts, and other relevant materials, past and present, serving as bases for study and analyses. Some example of data are:

- The types of Loans secured by borrowers (for a credit survey)
- The items of raw materials required for a product line (Materials management)
- The quantity of each material required for a unit of output
- The sex, age, social class, religion, income level of respondents in a consumer behaviour study
- The opinions of eligible couples on birth control devices (Family Planning Survey)
- The capital expenditure proposals considered by a firm during a year (Financial Management)
- The marks obtained by students of a class in a test on a particular subject (Performances of students)

- ❖ The opinions of people on voting in a general election (Opinion Poll)
- ❖ The types of news read by newspaper readers (Readership Survey)
- ❖ The aspirations of management trainees (The emerging Managers in Indian enterprises)
- ❖ The types and frequency of breakdowns occurred in particular brand of scooter (Post-purchase Behaviour Survey) and so on.

Types of Data

The data needed for a social science research may be broadly classified into (a) Data pertaining to human beings, (b) Data relating to organizations, and (c) Data pertaining to territorial areas.

Personal data or data related to human beings consist of-

(1) Demographic and socio-economic characteristics of individuals: Age, sex, race, social class, religion, martial status, education, occupation, income, family size, location of the household, life style, etc.,

(2) Behavioural variables: Attitudes, opinions, awareness, knowledge, practice, intentions, etc.

Organisational data consist of data relating to an organization's origin, ownership, objectives, resources, functions, performance and growth.

Territorial data are related to geophysical characteristics, resources endowment, population, occupational pattern, infrastructure, structure, degree of development, etc. of spatial divisions like villages, cities, talukas, districts, state and the nation.

Importance of data

The data serve as the bases or raw materials for analysis. Without an analysis of factual data, no specific inferences can be drawn on the questions under study. Inferences based on imagination or guess work cannot provide correct answers to research questions. The relevance, adequacy and reliability of data determine the quality of the findings of a study.

Data form the basis for testing the hypotheses formulated in a study. Data also provide the facts and figures required for constructing measurement scales and tables, which are analysed with statistical techniques. Inferences on the results of statistical analysis and tests of significance provide the answers to research questions. Thus, the scientific process of measurements, analysis,

testing and inferences depends on the availability of relevant data and their accuracy. Hence, the importance of data for nay research study.

SOURCES OF DATA

The sources of data may be classified into (a) primary sources and (b) secondary sources.

(a) Primary Sources

Primary sources are original sources from which the researcher directly collects data that have not been previously collected, e.g., collection of data directly by the researcher on brand awareness, brand preference, brand loyalty and other aspects of consumer behaviour from a sample of consumers by interviewing them. Primary data are first-hand information collected through various methods such as observation, interviewing, mailing etc.

(b) Secondary Sources

These are sources containing data which have been collected and compiled for another purpose. The secondary sources consists of readily available compendia and already compiled statistical statements and reports whose data may be used by researches for their studies, e.g, census reports, annual reports and financial statements of companies, Statistical statements, Reports of Government Departments, Annual Reports on currency and finance published by the Reserve Bank of India, Statistical Statements relating to Cooperatives and Regional Rural Banks, published by the NABARD, Reports of the National Sample Survey Organisation, Reports of trade associations, publications of international organizations such as UNO, IMF, World Bank, ILO, WHO, etc., Trade and Financial Journals, newspapers, etc.,

Secondary sources consists of not only published records and reports, but also unpublished records. The latter category includes various records and registers maintained by firms and organizations, e.g., accounting and financial records, personnel records, register of members, minutes of meetings, inventory records, etc.

Features of Secondary Sources: Though secondary sources are diverse and consist of all sorts of materials, they have certain common characteristics.

First, they are readymade and readily available, and do not require the trouble of constructing tools and administering them.

Second, they consist of data over which a researcher has no original control over collection and classification. Both the form and the content of

secondary sources are shaped by others. Clearly, this is a feature which can limit the research value of secondary sources.

Finally, secondary sources are not limited in time and space. That is, the researcher using them need not have been present when and where they were gathered.

USE OF SECONDARY DATA

Uses

The secondary data may be used in three ways by a researcher. First, some specific information from secondary sources may be used for reference purpose. For example, the general statistical information in the number of cooperative credit societies in the country, their coverage of villages, their capital structure, volume of business, etc. may be taken from published reports and quoted as background information in a study on the evaluation of performance of cooperative credit societies in a selected district/state.

Second, secondary data may be used as bench marks against which the findings of a research may be tested, e.g., the findings of a local or regional survey may be compared with the national averages; the performance indicators of a particular bank may be tested against the corresponding indicators of the banking industry as a whole; and so on.

Finally, secondary data may be used as the sole source of information for a research project. Such studies as securities Market Behaviour, Financial Analysis of Companies, Trends in credit allocation in commercial banks, Sociological Studies on crimes, historical studies, and the like depend primarily on secondary data. Year books, statistical reports of government departments, report of public organizations of Bureau of Public Enterprises, Census Reports etc. serve as major data sources for such research studies.

Advantages

Secondary sources have some advantages:

1. Secondary data, if available can be secured quickly and cheaply. Once their source of documents and reports are located, collection of data is just a matter of desk work. Even the tediousness of copying the data from the source can now be avoided, thanks to xeroxing facilities.

2. Wider geographical area and longer reference period may be covered without much cost. Thus, the use of Secondary data extends the researcher's space and time reach.

3. The use of Secondary data broadens the data base from which scientific generalizations can be made. This is especially so when data from several environmental and cultural settings are required for the study.

4. The use of Secondary data enables a researcher to verify the findings based on primary data. It readily meets the need for additional empirical support. The researcher need not await the time when additional primary data can be collected.

Disadvantages/Limitations

The use of secondary data has its own limitations:

1. The most important limitation is the available data may not meet our specific needs. The definitions adopted by those who collected those data may be different; units of measure may not match; and time periods may also be different.

2. The available data may not be as accurate as desired. To assess their accuracy we need to know how the data were collected.

3. The Secondary data are not uptodate and become obsolete when they appear in print, because of time lag in producing them. For example, population census data are published two or three years later after compilation, and no new figures will be available for another ten years.

4. Finally information about the whereabouts of sources may not be available to all social scientists. Even if the location of the source is known, the accessibility depends primarily on proximity. For example, most of the unpublished official records and compilations are located in the capital city, and they are not within the easy reach of researchers based in far off places.

Evaluation of Secondary Data

When a researcher wants to use secondary data for his research, he should evaluate them before deciding to use them.

Data pertinency: The first consideration in evaluation is to examine the pertinency of the available secondary data to the research problem under study. The following questions should be considered:

1. What are the definitions and classifications employed? Are they consistent with our own?

2. What are the measurements of variables used? What is the degree to which they conform to the requirements of our research?
3. What is the coverage of the secondary data in terms of topic and time? Does this coverage fit the needs of our research?

On the basis of above consideration, the pertinency of the secondary data to the research on hand should be determined. As researcher who is imaginative and flexible may be able to redefine his research problem so as to make use of otherwise unusable available data.

Data quality: If the researcher is convinced that the available secondary data fit his needs, the next step is to examine the quality of the data.

The quality of data refers to their accuracy, reliability and completeness.

The assurance and reliability of the available secondary data depends on the organisation which collected them and the purpose for which they were collected. What is the authority and prestige of the organisation? Is it well recognized? Is it noted for reliability? It it capable of collecting reliable data? Does it use trained and well qualified investigators? The answers to these questions determine the degree of confidence we can have in the data and their accuracy.

It is important to go to the original source of the secondary data rather than to use an immediate source which has quoted from the original. Then only, the researcher can review the cautionary and other comments that were made in the original source.

The completeness refers to the actual coverage of the published data. This depends on the methodology and sampling design adopted by the original organisation. Is the methodology sound? Is the sample size small or large? Is the sampling method appropriate? Answers to these questions may indicate the appropriateness and adequacy of the data for the problem under study.

The question of possible bias should also be examined. Whether the purpose for which the original organisation collected the data had a particular orientation? Has the study been made to promote the organisation's own interest? How the study was conducted? These are important clues.

The researcher must be on guard when the source does not report the methodology and sampling design. Then it is not possible to determine the adequacy of the secondary data for the researcher's study.

METHODS OF COLLECTING PRIMARY DATA: GENERAL

Introduction

Primary data are directly collected by the researcher from their original sources. In this case, the researcher can collect the required data precisely according to his research needs, he can collect them when he wants them and in the form he needs them. But the collection of primary data is costly and time consuming. Yet, for several types of social science research required data are not available from secondary sources and they have to be directly gathered from the primary sources.

In such cases where the available data are inappropriate, inadequate or obsolete, primary data have to be gathered. They include: socio-economic surveys, social anthropological studies of rural communities and tribal communities, sociological studies of social problems and social institutions, marketing research, leadership studies, opinion polls, attitudinal surveys, readership, radio listening and T.V. viewing surveys, knowledge-awareness practice (KAP) studies, farm management studies, business management studies, etc.,

Methods of Primary Data Collection

There are various methods of data collection. A 'Method' is different from a 'Tool'. While a method refers to the way or mode of gathering data, a tool is an instrument used for the method. For example, a schedule is used for interviewing. The important methods are **(a) observation, (b) interviewing, (c) mail survey, (d) experimentation, (e) simulation, and (f) projective technique.**

Observations involves gathering of data relating to the selected research by viewing and or listening. Interviewing involves face-to-face conversation between the investigator and the respondent. Mailing is used for collecting data by getting questionnaires completed by respondents. Experimentation involves a study of independent variables under controlled conditions. Experiments may be conducted in a laboratory or in field in a natural setting. Simulation involves creation of an artificial situation similar to the actual life situation. Projective methods aim at drawing inferences on the characteristics of respondents by presenting to them stimuli. Even method has its advantages and disadvantages.

Choice of Methods of Data Collection

Which of the above methods of data collection should be selected for a proposed research project? This is one of the questions to be considered while designing the research plan. One or more methods has/have to be chosen. The choice of a method or methods depends upon the following factors:

1. **The nature of the study of the subject-matter:** If it is a study of opinions/preferences of persons, interviewing or mailing may be appropriate depending on the educational level of the respondents. On the other hand, an impact study may call for experimentation; and a study of behavioural pattern may require observation.
2. **The unit of enquiry:** The unit of enquiry may be an individual, household institution or community. To collect data from households, interviewing is preferable. Data from institutions may be collected by mail survey and studies on communities call for observational method.
3. **The size and spread of the sample:** If the sample is small and the area covered is compact interviewing may be preferable, but a large sample scattered over a wider area may require mailing.
4. **Scale of the survey:** A large scale may require mailing or interviewing through trained investigators.
5. **The educational level of respondents:** For a simple survey among educated persons concerned with the subject-matter of study, a mail survey may be appropriate. But for a survey of less educated/illiterate persons like industrial workers, slum dwellers, rural people, interviewing is the only suitable method.
6. **The type and depth of information to be collected:** For collection of general, simple, factual and non-emotional data, interviewing or mailing is appropriate. For an indepth survey of personal experiences and sensitive issues, indepth interview is essential. For collection of data on behaviour, culture, customs, life style etc., observational method is required.
7. **The availability of skilled and trained manpower:** In this case, even for a large general survey entailing many complicated questions, interviewing can be adopted.
8. **The rate of accuracy and representative nature of the data required:** Interviewing is the most appropriate method for collecting accurate data from a representative sample of population. Interviewing can achieve a higher response rate.

A researcher can select one or more of the methods keeping in view the above factors. No method is universal. Each method's unique features should be compared with the needs and conditions of the study and thus the choice of the methods should be decided.

Evaluation of Data Collection Methods

The appropriateness of a method of data collection may be evaluated on the basis of the following criteria:

1. The efficiency i.e., the speed and cost of data collection,
2. Data quality and adequacy i.e., response rate, accuracy and objectivity,
3. Naturalness of setting,
4. Anonymity,
5. Interviewer supervision,
6. Control of context and question order,
7. Ability to use visual aids,
8. Potential for controlling variables and
9. Dependence on respondent's reading and writing ability.

OBSERVATION

Meaning and Importance

Observation means viewing or seeing. We go on observing something or other while we are awake. Most of such observations are just casual and have no specific purpose. But observation in a method of data collection is different from such casual viewing.

Observation may be defined as a systematic viewing of a specific phenomenon in its proper setting for the specific purpose of gathering data for a particular study. Observation as a method includes both 'seeing' and 'hearing'. It is accompanied by perceiving as well.

Observation is a classical method of scientific enquiry. The body of knowledge of various natural and physical sciences such as biology, physiology, astronomy, plant ecology etc. has been built upon centuries of systematic observation.

Observation also plays a major role in formulating and testing hypothesis in social sciences. Behavioural scientists observe interactions in small groups;

anthropologists observe simple societies, and small communities; political scientists observe the behaviour of political leaders and political institutions. In a sense, as the Webbs[1] have pointed out, all social research begins and ends with observation. A researcher silently watching a city council or a trade union committee or quality circle or a departmental meeting or a conference of politicians or others picks up hints that help him to formulate new hypothesis. He can test them through further observation and study.

Observation becomes scientific, when it (a) serves a formulated research purpose, (b) is planned deliberately, (c) is recorded systematically, and (d) is subjected to checks and controls on validity and reliability. Validity refers to the extent to which the recorded observations accurately reflect the construct they are intended to measure. Validity is assessed by examining how well the observations agree with alternative measures of the same construct. Reliability entails consistency and freedom from measurement error. This is usually assessed in terms of (a) the extent to which two or more independent observers agree in their ratings of the same event; and (b) the repeatability of observations over time by means of test-retest comparisons.

Characteristics

Observations as a method of data collection has certain characteristics.

1. It is both a physical and a mental activity. The observing eye 'catches' many things which are slighted, but attention is focused on data that are pertinent to the given study.
2. Observation is selective. A researcher does not observe anything and everything, but selects the range of things to be observed on the basis of the nature, scope and objectives of his study. For example, suppose a researcher desires to study the causes of city road accidents and has formulated a tentative hypothesis that accidents are caused by violation of traffic rules and overspeeding. When he observes the movements of vehicles on the road, many things are before his eyes: the type, make, size and colour of the vehicles, the persons sitting in them, their hair style, etc. All such things which are not relevant to his study are ignored and only overspeeding and traffic violations are keenly observed by him.
3. Observation is purposive and not casual. It is made for the specific purpose of noting things relevant to the study.

4. It captures the natural social context in which persons' behaviour occurs.
5. It grasps the significant events and occurrences that affect social relations of the participants.
6. Observation should be exact and be based on standardized tools of research such as observation schedule, social-metric scale, etc., and precision instruments, if any.

Types of Observation

Observation may be classified in different ways. With reference to investigator's role, it may be classified into (a) participant observation, and (b) non-participant observation. In terms of mode of observation, it may be classified into (c) direct observation and (d) indirect observation. With reference to the rigor of the system adopted, observation is classified into (e) controlled observation, and (f) uncontrolled observation.

(a) Participant observation: In this observation, the observer is a part of the phenomenon or group which is observed and he acts as both an observer and a participant. For example, a study of tribal customs by an anthropologist by taking part in tribal activities like folk dance. The persons who are observed should not be aware of the researcher's purpose. Then only their behaviour will be 'natural'. The concealment of research objective and researcher's identity is justified on the ground that it makes it possible to study certain aspects of the group's culture which are not revealed to outsiders.

Advantages: The advantages of participant observation are:

(1) The observer can understand the emotional reactions of the observed group, and get a deeper insight of their experiences.

(2) The observer will be able to record context which gives meaning to the observed behaviour and heard statements.

Disadvantages: Participant observation suffers from some demerits.

1. The participant observer narrows his range of observation. For example, if there is a hierarchy of power in the group/community under study, he comes to occupy one position within it, and thus other avenues of information are closed to him.
2. To the extent that the participant observer participates emotionally, the objectivity is lost.

3. Another limitation of this method is the dual demand made on the observer. Recording can interfere with participation, and participation can interfere with observation. Recording on the spot is not possible and it has to be postponed until the observer is alone. Such time lag results in some inaccuracy in recording.

Because of the above limitations, participant observation is generally restricted to those cases where non-participant observation is not practical, e.g., a study of the functioning of a mobile library or mobile bank or tribal community etc.

(b) Non-participant observation: In this method, the observer stands apart and does not participate in the phenomenon observed. Naturally, there is no emotional involvement on the part of the observer. This method calls for skill in recording observations in an unnoticed manner.

(c) Direct observation: This means observation of an event personally by the observer when it takes place. This method is flexible and allows the observer to see and record subtle aspects of events and behaviour as they occur. He is also free to shift places, change the focus of the observation. A limitation of this method is that the observer's perception circuit may not be able to cover all relevant events when the latter move quickly, resulting in the incompleteness of the observation.

(d) Indirect observation: This does not involve the physical presence of the observer, and the recording is done by mechanical, photographic or electronic devices, e.g., recording customer and employee movements by a special motion picture camera mounted in a department of a large store. This method is less flexible than direct observation, but it is less biasing and less erratic in recording accuracy. It also provides a permanent record for an analysis of different aspects of the event.

(e) Controlled observation: This involves standardization of observational techniques and exercise of maximum control over extrinsic and intrinsic variables by adopting experimental design and systematically recording observations

Controlled observation is carried out either in the laboratory or in the field. It is typified by clear and explicit decisions on what, how and when to observe. It is primarily used for inferring causality, and testing causal hypothesis.

(f) Uncontrolled observation: This does not involve control over extrinsic and intrinsic variables. It is primarily used for descriptive research. Participant observation is a typical uncontrolled one.

Planning Observation

The use of observation method requires proper planning.

First, the researcher should carefully examine the relevance of observation method to the data needs of the selected study.

Second, he must identify the specific investigative questions which call for use of observation method. These determine the data to be collected.

Third, he must decide the observation content, viz., specific conditions , events and activities that have to be observed for the required data. The observation content should include the relevant variables.

Fourth, for each variable chosen, the operational definition should be specified.

Fifth, the observation setting, the subjects to be observed, the timing and mode of observation, recording, procedure, recording instruments to be used, and other details of the task should be determined.

Last, observers should be selected and trained. The persons to be selected must have sufficient concentration powers, strong memory power and unobtrusive nature. Selected persons should be imparted both theoretical and practical training.

Conditions of Effective Observation

These conditions consist of:

1. Observations must be done under conditions which will permit accurate results. The observer must be in vantage point to see clearly the objects to be observed. The distance and the light must be satisfactory. The mechanical devices used must be in good working conditions and operated by skilled persons.
2. Observation must cover a sufficient number of representative samples of the cases.
3. Recording should be accurate and complete.
4. The accuracy and completeness of recorded results must be checked. A certain number of cases can be observed again by another observer/ another set of mechanical devices, as the case may be. If it is feasible, two separate observers and sets of instruments may be used in all or some of the original observations. The results could then be compared to determine their accuracy and completeness.

Observation Tools and Recording Devices

Systematic observation requires the use of observation schedule (or Observationnaire), diary, and various mechanical recording devices.

Schedule: The data requirements are identified by analyzing the core of the problem, the objectives of the study, the investigative questions, hypothesis and the operational definition of concepts and out of the data requirements, items of data to be colleted through observation are identified. A schedule is then constructed, covering those items of data.

It should be constructed in such a manner as to make it possible to record the necessary information easily and correctly. Enough space should be provided for recording observations for each item. The item should appear in logical groupings and in the order in which the observer would observe them.

Field observation log: This may take the form of a diary or cards. Each item of observation is recorded under appropriate sub-heading. At the time of observation, rough notings may be made, and at the end of the day, full log may be made. The card system is flexible and facilitates arrangement and re-arrangement of items in any desired order.

Mechanical devices: These may include cameras, tape recorders, videotape and electronic devices. Still, motion, sound, colour and timelapse cameras give a permanent record of events, Microscopic and telescopic lens may be used in cameras. Eye cameras are common in advertising and package research. They record eye movements while a consumer is looking at advertisements or packages. Other recording instruments are: tape, disc, and wire recorders, barometer, hygrometers, speedometers, one-way screens and mirrors, closed-circuit television, light meters, pocket calculators.

Suitability and Application

Observation is suitable for a variety of research purposes. It may be used for studying (a) the behaviour of human beings and social groups: life styles customs and manner, interpersonal relations, group dynamics, crowd behaviour, leadership styles, managerial style, other behaviours and actions; (b) the behaviour of other living creatures like birds, animals etc., (c) physical characteristics of inanimate things like stores, factories residences, etc., (d) flow of traffic and parking problems; (e) movement of materials/products through a plant.

It may be used in exploratory research to gain insights that will be subsequently tested as hypotheses. It may be used to collect supplementary

data that may interpret or qualify findings obtained by other methods. Observation may be used as the primary method, e.g., anthropological studies of communities, behavioural studies of small groups.

Observation may be used in studying behaviour in 'natural' setting or in the laboratory, e.g., group formation may be studied as it occurs in a real-life situation or in the laboratory room.

Advantages

Observation has certain advantages.

1. The main virtue of observation is its directness;[1] it makes it possible to study behaviour as it occurs. The researcher need not ask people about their behaviour and interactions; he can simply watch what they do and say.
2. Data collected by observation may describe the observed phenomena as they occur in their natural settings. Other methods introduce elements or artificiality into the researched situation for instance, in interview, the respondent may not behave in a natural way. There is no such artificiality in observational studies, especially when the observed persons are not aware of their being observed.
3. Observation is more suitable for studying subjects who are unable to articulate meaningfully, e.g., studies of children, tribal, animals, birds, etc.
4. Observation improves the opportunities for analyzing the contextual background of behaviour. Furthermore verbal resorts can be validated and compared with behaviour through observation. The validity of what men of position and authority say can be verified by observing what they actually do.
5. Observation makes it possible to capture the whole event as it occurs. For example, only observation can provide an insight into all the aspects of the process of negotiation between union and management representatives.
6. Observation is less demanding of the subjects and has less biasing effect on their conduct than does questioning.
7. It is easier to conduct disguised observation studies than disguised questioning.

8. Mechanical devices may be used for recording data in order to secure more accurate data and also of making continuous observations over longer periods.

Limitations

Observation cannot be used indiscriminately for all purposes. It has its own limitations.

1. Observation is of *no use of studying past events or activities.* One has to depend upon documents or narrations by people for studying such things.
2. It is *not suitable for studying opinions and attitudes.* However, an observation of related behaviour affords a good clue to the attitudes, e.g., and observation of the seating patterns of high caste and class persons in a general meeting in a village may be useful for forming an index of attitude.
3. Observation poses difficulties in obtaining a *representative sample.* For interviewing and mailing methods, the selection of a random sampling can be readily ensured. But observing people of all types does not make the sample a random one.
4. Observation cannot be used as and when the researcher finds it *convenient to use it. He has to wait for the event to occur.* For example, an observation of folk dance of a tribal community is possible, only when it is performed.
5. A major limitation of this method is that the observer normally *must be at the scene of the event when it takes place.* Yet it may not be possible to predict where and when the event will occur, e.g., road accident, communal clash.
6. Observation is a *slow and expensive process,* requiring human observers and/or costly surveillance equipments.

INTERVIEWING

Definition

Interviewing is one of the prominent methods of data collection. It may be defined as a two-way systematic conversation between an investigator and an informant, initiated for obtaining information relevant to a specific study. It involves not only conversation, but also leaning from the respondent's gestures, facial expressions and pauses, and his environment.

Interviewing requires face-to-face contact or contact over telephone and calls for interviewing skills. It is done by using a structured schedule or an unstructured guide.[2]

Importance

Interviewing may be used either as a main method or as a supplementary one in studies of persons. Interviewing is the only suitable method for gathering information from illiterate or less educated respondents. It is useful for collecting a wide range of data from factual demographic data to highly personal and intimate information relating to a person's opinions, attitudes, values, beliefs, past experience and future intentions. When qualitative information is required or probing is necessary to draw out fully, then interviewing is required. Where the area covered for the survey is a compact, or when a sufficient number of qualified interviewers are available, personal interview is feasible.

Interview is often superior to other data-gathering methods. People are usually more willing to talk than to write. Once rapport is established, even confidential information may be obtained. It permits probing into the context and reasons for answers to questions.

Interview can add flesh to statistical information. It enables the investigator to grasp the behavioural context of the data furnished by the respondents. It permits the investigator to seek clarifications and brings to the forefront those question, that for one reason or another, respondents do not want to answer.

Evaluation of Interviewing

Advantages: There are several real advantages to personal interviewing. First, "the greatest value of this method is the depth and detail of information that can be secured. When used with a well-conceived schedule, an interview can obtain a great deal of information. It far exceeds mail survey in amount and quality of data that can be secured.

Second, the interviewer can do more to improve the percentage of responses and the quality of information received than other method. He can note the conditions of the interview situation, and adopt appropriate approaches to overcome such problems as the respondent's unwillingness, incorrect understanding of question, suspicion, etc.

Third, the interviewer can gather other supplemental information like economic level, living conditions etc. Through observation of the respondent's environment.

Fourth, the interviewer can use special scoring devices, visual materials and like in order to improve the quality of interviewing.

Fifth, the accuracy and dependability of the answers given by the respondent can be checked by observation and probing.

Last, interview is flexible and adaptable to individual situations. Even more control can be exercised over the interview situation.

Limitations: Interviewing is not free from limitations. Its greatest drawback is that it is costly, both in money and time.

Second, the interview results are often adversely affected by interviewer's mode of asking questions and interactions, and incorrect recording and also be the respondent's faulty perception, faulty memory, inability to articulate etc.

Third, certain types of personal and financial information may be refused in face-to-face interviews. Such information might be supplied more willingly on mail questionnaires, especially if they are to be unsigned.

Fourth, interview poses the problem of recording information obtained from the respondents. No foolproof system is available. Note taking is invariably distracting to both the respondent and the interviewer and affects the thread of the conversation.

Last, interview calls for highly skilled interviewers. The availability of such persons is limited and the training of interviewers is often a long and costly process.

Characteristics

Interviewing as a method of data collection has certain characteristics. They are:

1. The participants - the interviewer and the respondent - are strangers. Hence, the investigator has to get himself introduced to the respondent in an appropriate manner.
2. The relationship between the participants is a transitory one. It has a fixed beginning and termination points. The interview proper is a fleeting, momentary experience for them.
3. Interview is not a mere casual conversational exchange, but a conversation with a specific purpose, viz., obtaining information relevant to a study.
4. Interview is a mode of obtaining verbal answers to questions put verbally.

5. The interaction between the interviewer and the respondent need not necessarily be on a face-to-face basis, because interview can be conducted over the telephone also.

6. Although interview is usually a conversation between two persons, it need not be limited to a single respondent. It can also be conducted with a group of persons, such as family members, or a group of children or a group of customers, depending on the requirements of the study.

7. Interview is an *interactional process*. The interaction between the interviewer and the respondent depends upon how they perceive each other. The respondent reacts to the interviewer's appearance, behaviour, gestures, facial expression and intonation, his perception of the thrust of the questions and his own personal needs. As far as possible, the interviewer should try to be closer to the socio-economic level of the respondents. Moreover, he should realize that his respondents are under no obligation to extend response. He should, therefore, be tactful and be alert to such reactions of the respondents as lame-excuse, suspicion, reluctance or indifference, and deal with them suitably. He should not also argue or dispute. He should rather maintain an impartial and objective attitude.

8. Information furnished by the respondent in the interview is recorded by the investigator. This poses a problem of seeing that recording does not interfere with the tempo of conversation.

9. Interviewing is not a standardized process like that of a chemical technician; it is rather a flexible psychological process.

The implication of this feature is that the interviewer cannot apply unvarying standardized technique, because he is dealing with respondents with varying motives and diverse perceptions. The extent of his success as an interviewer is very largely dependent upon his insight and skill in dealing with varying socio-psychological situations.

Requirements

The requirements or conditions necessary for a successful interview are:

1. **Data availability:** The needed information should be available with the respondent. He should be able to conceptualize it in terms useful to the study, and be capable of communicating it.

2. **Role perception:** The respondent should understand his role and know what is required of him. He should know what is a relevant answer and how complete it should be. He can learn much of this from the interviewer's introduction, explanations and questioning procedure.

3. The interviewer should also know his role. He should establish a permissive atmosphere and encourage frank and free conversation. He should not affect the interview situation through subjective attitude, argumentation, etc.

4. **Respondent's motivation:** The respondent should be willing to respond and give accurate answer. This depends partly on the interviewer's approach and skill. The interview has interest in it for the purpose of his research, but the respondent has no personal interest in it. Therefore, the interviewer should establish a friendly relationship with the respondent, and create in him an interest in the subject-matter of the study.

   The interviewer should try to reduce the effect of demotivating factors like desire to get on with other activities, embarrassment at ignorance, dislike of the interview content, suspicious about the interviewer, and fear of consequences. He should also try to build up the effect of motivating factors like curiosity, loneliness, politeness, sense of duty, respect of the research agency and liking for the interviewer.

The above requirement reminds that the interview is an interactional process. The investigator should keep this in mind and take care to see that his appearance and behaviour do not distort the interview situation.

Types of Interviews

The interviews may be classified into: (a) structured or directive interview, (b) unstructured or non-directive interview, (c) focused interview, and (d) clinical interview and (d) depth interview.

(a) Structured, Directive Interview

This is an interview made with a detailed standardized schedule. The same questions are put to all the respondents and in the same order. Each question is asked in the same way in each interview, promoting measurement reliability. This type of interview is used for large-scale formalized surveys.

Advantages: This interview has certain advantages. First, data from one interview to the next one are easily comparable. Second, recording and coding

data do not pose any problem, and greater precision is achieved. Lastly, attention is not diverted to extraneous, irrelevant and time-consuming conversation.

Limitation: However, this type of interview suffers from some limitations. First, it tends to lose the spontaneity of natural conversation. Second, the way in which the interview is structured may be such that the respondent's views are minimized and the investigator's own biases regarding the problem under study are inadvertently introduced. Lastly, the scope for exploration is limited.

(b) Unstructured or Non-directive Interview

This is the least structured one. The interviewer encourages the respondent to talk freely about a given topic with a minimum of prompting or guidance.

In this type of interview, a detailed pre-planned schedule is not used. Only a broad interview guide is used. The interviewer avoids channeling the interview directions. Instead, he develops a very permissive atmosphere. Questions are not standardized and not ordered in a particular way.

This interviewing is more useful in case studies rather than in surveys. It is particularly useful in exploratory research where the lines of investigation are not clearly defined. It is also useful for gathering information on sensitive topics such as divorce, social discrimination, class conflict, generation gap, drug-addition etc. It provides opportunity to explore the various aspects of the problem in an unrestricted manner.

Advantages: This type of interview has certain special advantages. It can closely approximate the spontaneity of a natural conversation. It is less prone to interviewer's bias. It provides greater opportunity to explore the problem in an unrestricted manner.

Limitations: Though the unstructured interview is a potent research instrument, it is not free from limitations.

One of its major limitations is that the data obtained from one interview is not comparable to the data from the next. Hence, it is not suitable for surveys.

Time may be wasted in unproductive conversations. By not focusing on one or another facet of a problem, the investigator may run the risk of being led up blind ally.

As there is no particular order or sequence in this interview, the classification of responses and coding may require more time.

This type of informal interviewing calls for greater skill than the formal survey interview.

(c) Focused Interview

This is a semi-structured interview where the investigator attempts to focus the discussion on the actual effects of a given experience to which the respondents have been exposed. It takes place with the respondents known to have involved in a particular experience, e.g., seeing a particular film, viewing a particular programme on T.V., involved in a train/bus accident, etc. The situation is analysed prior to the interview. An interview guide specifying topics relating to the research hypothesis is used. The interview is focused on the subjective experiences of the respondent, i.e., his attitudes, and emotional responses regarding the situation under study.[13]

The focused interview permits the interviewer to obtain details of personal reactions, specific emotions and the like.

Merits: This type of interview is free from the inflexibility of formal methods, yet gives the interview a set form and insures adequate coverage of all the relevant topics.

The respondent is asked for certain information, yet he has plenty of opportunity to present his views.

The interviewer is also free to choose the sequence of questions and determine the extent of probing.

(d) Clinical Interview

This is similar to the focused interview but with a subtle difference. While the focused interview is concerned with the effects of a specific experience, clinical interview is concerned with broad underlying feelings or motivations or with the course of the individual's life experiences.

The 'Personal history' interview used in social case work, prison administration, psychiatric clinics and in individual life history research is the most common type of clinical interview. The specific aspects of the individual's life history to be covered by the interview are determined with reference to the purpose of the study and the respondent is encouraged to talk freely about them.

(e) Depth Interview

This is an intensive and searching interview aiming at studying the respondent's opinion, emotions or convictions on the basis of an interview guide. This requires much more training inter-personal skills than structured

interviewing. This deliberately aims to elicit unconscious as well as extremely personal feelings and emotions.

This is generally a lengthy procedure designed to encourage free expression of affectively charged information. It requires probing.

The interviewer should totally avoid advising or showing disagreement. Of course, he should use encouraging expressions like "uh-huh" or "I see" to motivate the respondent to continue narration. Sometimes the depth interviewer has to face the problem of affection, i.e., the respondent may hide expressing affective feelings. The interviewer should handle such situation with great care.

Interviewing Process

The interviews process consists of the following stages:

- Preparation
- Introduction
- Developing rapport
- Carrying the interview forward
- Recording the interview, and
- Closing the interview.

(i) Preparation: The interviewing requires some preplanning and preparation. The interviewer should keep the copies of interview schedule/ guide (as the case may be) ready for use. He should also have the list of names and addresses of respondents, he should regroup them into contiguous groups in terms of location in order to save time and cost in travelling.

The interviewer should find out the general daily routine of the respondents in order to determine the suitable timings for interview.

Above all, he should mentally prepare himself for the interview. He should think about how he should approach a respondent, what mode of introduction he could adopt, what situations he may have to face and how he could deal with them.

The interviewer may come across such situations as respondents' avoidance, reluctance, suspicion, diffidence, inadequate responses, distortion, etc. The investigator should plan the strategies for dealing with them. If such preplanning is not done, he will be caught unaware and fail to deal appropriately when he actually faces any such situation. It is possible to plan in advance and keep the plan and mind flexible and expectant of new development.

(ii) Introduction: The investigator is a stranger to the respondents. Therefore he should be properly introduced to each of the respondents. What is the proper mode of introduction? There is no one appropriate universal mode of introduction. Mode varies according to the type of respondents.

When making a study of an organization or institution, the head of the organization should be approached first and his cooperation secured before contacting the sample inmates/employees.

When studying a community or a cultural group, it is essential to approach the leader first and to enlist his cooperation.

For a survey or urban households, the research organization's letter of introduction and the interviewer's identify card can be shown. In these days of fear of opening the door for a stranger, residents' cooperation can be easily secured, if the interviewer attempts to get him introduced through a person known to them, say a popular person in the area e.g., a social worker.

For interviewing rural respondents, the interviewer should never attempt to approach them along with someone from the revenue department, for they would immediately hide themselves, presuming that they are being contacted for collection of land revenue or subscription to some government bond. He should not also approach them through a local political leader, because persons who do not belong to his party will not cooperate with the interviewer. It is rather desirable to approach the rural respondents through the local teacher or social worker.

After getting himself introduced to the respondent in the most appropriate manner, the interviewer can follow a sequence of procedures as under, in order to motivate the respondent to permit the interview:

- With a smile greet the respondent in accordance with his cultural pattern
- Identify the respondent by name
- Describe the method by which the respondent was selected
- Mention the name of the organization conducting the research
- Assure the anonymity or confidential nature of the interview
- Explain their usefulness of the study
- Emphasize, the value of respondent's cooperation, making such statements as. "You are among the few in a position to supply the

information." "your response is invaluable." I have come to learn from your experience and knowledge."

The following short introduction will serve as an illustration:

Interviewer: "I'm from the department of Management Studies of Bangalore University. People talk of Japanese Style of management, American style of management and so on. What is the style of management in Indian enterprises? Is it just an imitation of Western style or is it based on our culture and value system? We should know the nature of our style of management. Is it not? This study is done throughout the country and the results will contribute to management thought and profession."

"The respondents for interview chosen may entirely change. The interview will just take about half-an-hour. All information is entirely confidential, of course."

A respondent often has reservations about being interviewed. He may suspect that the interviewer is a disguised salesman, bill collector, tax official or the like. The interviewer should skillfully clear such suspicion by establishing his identity.

The respondent may also feel incompetent or fear that he may not be able to answer questions relating to the study. Allay such kind of anxiety by reassuring him: "There are no right or wrong answers. This is not a quiz. We are trying to find how persons like you feel."

(iii) Developing rapport: Before starting the research interview, the interviewer should establish a friendly relationship with the respondent. This is described as "rapport." It means establishing a relationship of confidence and understanding between the interviewer and the respondent. It is a skill which depends primarily on the interviewer's commonsense, experience, sensitivity, and keen observation.

Start the conversation with a general topic of interest such as weather, current news, sports event, or the like perceiving the probable interest of the respondent from his context.

Such initial conversation may create a friendly atmosphere and a warm interpersonal relationship and mutual understanding of the other. However the interviewer should "guard against the over-rapport" as cautioned by Herbert Hyman.[14] Too much identification and too much courtesy result in tailoring replies to the image of a "nice interviewer." The interviewer should use his discretion in striking a happy medium.

(iv) Carrying the interview forward: After establishing rapport, the technical task of asking questions from the interview schedule starts. This task requires care, self-restraint, alertness and ability to listen with understanding, respect and curiosity.

In carrying on this task of gathering information from the respondent by putting questions to him, the following guidelines may be followed:

1. Start the interview. Carry it on in an informal, natural conversational style.
2. Ask all the applicable questions in the same order as they appear on the schedule without any elucidation and change in the wording. Ask all the applicable questions listed in the schedule. Do not take answers for granted.
3. If interview guide is used, the interviewer may tailor his questions to each respondent, covering, of course, the areas to be investigated.
4. Know the objectives of each questions so as to make sure that the answers adequately satisfy the question objectives.
5. If a question is not understood, repeat it slowly with proper emphasis and appropriate explanation, when necessary.
6. Take all answers naturally, never showing disapproval or surprise. When the respondent does not meet with interruptions, denial, contradiction and other harassment, he may feel free and may not try to withhold information. He will be motivated to communicate when the atmosphere is permissive and the listener's attitude is non-judgement and is genuinely absorbed in the revelations.
7. Listen quietly with patience and humility. Give not only undivided attention, but also personal warmth. At the same time, be alert and analytic to incomplete, nonspecific and inconsistent answers, but avoid interrupting the flow of information. If necessary, jot down unobtrusively the points which need elaboration or verification for later and more timely probing.

   The appropriate technique for this probing is to ask for further clarification in such a polite manner as: "I am not sure I understood fully. Is this....what you meant?"
8. Neither argue nor dispute.
9. Show genuine concern and interest in the ideas expressed by the

respondent, at the same time, maintain an impartial and objective attitude.

10. Should not reveal your own opinion or reaction. Even when you are asked for your views, laugh off the request, saying "Well, your opinions are more important than mine."

11. At times the interview "runs dry" and needs restimulation. Then use such expressions as "Uh-huh" or "That's interesting" or "I see," "can you tell me more about that?" and the like.

12. When the interviewee fails to supply his reactions to related past experiences, represent the stimulus situation, introducing appropriate questions which will aid in revealing the past. "Under what circumstances did such and such a phenomenon occur?" or "How did you feel about it and the like.

13. At times, the conversation may go off the track. Be alert to discover drifting, steer the conversation back to the track by some such remark as, "You know, I was very much interested in what you said a moment ago. Could you tell me more about it?"

14. When the conversation turns to some intimate subjects, and particularly when it deals with crises in the life of the individual, emotional blockage may occur. Then drop the subject for the time being and pursue another line of conversation for a while so that a less direct approach to the subject can be made later.

15. When there is a pause in the flow of information, do not hurry the interview. Take is as a matter of course with an interested look or a sympathetic half-smile. If the silence is too prolonged, introduce a stimulus saying "You mentioned that....What happened then?"

Additional sittings: In the case of qualitative interviews involving longer duration, one single sitting will not do, as it would cause interview weariness. Hence, it is desirable to have two or more sittings with the consent of the respondent.

(v) Recording the interview: It is essential to record responses as they take place. If the note-taking is done after the interview, a good deal of relevant information may be lost. Nothing should be made in the schedule under respective question. It should be complete and verbatim. The responses should not be summarized or paraphrased. How can complete recording be made without interrupting the free flow of conversation? Electronic transcription

through devices like tape recorder can achieve this. It has obvious advantages over note-taking during the interview. But it also has certain disadvantages. Some respondents may object to or fear "going on record." Consequently the risk of lower response rate will arise especially for sensitive topics.

If the interviewer knows short-hand, he can use it with advantage. Otherwise, he can write rapidly by abbreviating word and using only key words and the like. However, even the fast writer may fail to record all that is said at conversational speed. At such times, it is useful to interrupt by some such comment as "that seems to be a very important point, would you mind repeating it, so that I can get your words exactly." The respondent is usually flattered by this attention and the rapport is not disturbed.

The interviewer should also record all his probes and other comments on the schedule in brackets to set them off from responses.

With the pre-coded structured questions, the interviewers task is easy. He has to simply ring the appropriate code or tick the appropriate box, as the case may be. He should not make mistakes by carelessly ringing or ticking a wrong item.

(vi) Closing the interview: After the interview is over, take leave off the respondent, thanking him with a friendly smile.

In the case of a qualitative interview of longer duration, select the occasion for departure more carefully. Assembling the papers for putting them in the folder at the time of asking the final question sets the stage for a final handshake, a thank-you and a good-bye. If the respondent desires to know the result of the survey, note down his name and address so that a summary of the result could be posted to him when ready.

Editing: At the close of the interview, the interviewer must edit the schedule to check that he has asked all the questions and recorded all the answers and that there is no inconsistency between answers. Abbreviations in recording must be replaced by full words. He must ensure that everything is legible.

It is desirable to record a brief sketch of his impressions of the interview and observational notes on the respondent's living environment, his attitude to the survey, difficulties, if any, faced in securing his cooperation and the interviewer's assessment of the validity of the respondent's answers.

Interview Problems

In personal interviewing, the researcher must deal with two major problem, inadequate response, non-response and interviewer's bias.

Inadequate response: Kahn and Cannel[3] distinguish five principal symptoms of inadequate response. They are: partial response, in which the respondent gives a relevant but incomplete answer; non-response, when the respondent remains silent or refuses to answer the question; irrelevant response, in which the respondent's answer is not relevant to the question asked; inaccurate response, when the reply is biased or distorted; and the verbalized response problem, which arises on account of respondent's failure to understand a question or lack of information necessary for answering it.

One possible approach to deal with an inadequate response is to allow a brief expectant pause with an expectant glance. Another way to encourage the respondent is to use such expressions as, "I see?" "Is it?" or to put a supplementary neutral question as "What do you mean?", "Can you tell me more about that?" or "Can you explain little more fully?"

If the respondent's answer is ambiguous or inexplicit, probes like "How do you mean?" or "In what way?" can be used to clarify his answer. For exploring other aspects of the respondent's opinion, if any, probes like "Is there anything else?" or "Are there any other reasons?" can be used.

For a 'don't know' answer, over-probing is counter-productive. If motivational probing fails, no further probing should be attempted.

The problem of inaccurate response is common in economic surveys. The respondents have difficulty in furnishing accurate information on 'sensitive' matters like asset holdings, income, expenditure, saving and investments. It is difficult to deal with this problem. Perhaps one possible approach is to use indirect questions instead of direct questions for securing information on above matters, and to cross-check with information furnished on other related questions. For example, data on income can be verified with the details on occupation.

Interviewer's bias: The interviewer is an important cause of response bias. He may resort to cheating by 'cooking up' data without actually interviewing.

The interviewers can influence the responses by inappropriate suggestions, word emphasis, tone of voice and question rephrasing. His own attitudes and expectations about what a particular category of respondents may say or think may bias the data.

The respondent's perception of the interviewer's characteristics (education, apparent social status, etc) may also bias his answers.

Another source of response bias arises from interviewer's perception of the situation. If he regards the assignment as impossible or sees the results of the survey as a possible threat to personal interests or beliefs he is likely to introduce bias.

As interviewers are human beings, such biasing factors can never be overcome completely, but their effects can be reduced by careful selection and training of interviewers, proper motivation and supervision, standardization of interview procedures (use of standard wording in survey questions, standard instructions on probing procedure an so on) and standardization of interviewer behaviour. There is need for more research on ways to minimize bias in the interview.

Non-response

Non-response refers to failure to obtain responses from some sample respondents. There are many sources of non-response; non-availability, refusal, incapacity, inaccessibility.

Non-availability: Some respondents may not be available at home at the time of call. This depends upon the nature of the respondent and the time of calls. For example employed persons may not be available during working hours. Farmers may not be available at home during cultivation season. Selection of appropriate timing for calls could solve this problem. Evenings and weekends may be favourable interviewing hours for such respondents. If someone is available, then the respondent's hours of availability can be ascertained and the next visit can be planned accordingly.

A respondent may be too busy, tired or out of station.

Call-backs to find the not-at-homes increase the overall response rate.

Refusal: Some persons may refuse to furnish information because they are ill-disposed, or approached at the wrong hour and so on. Although a hardcore of refusals remain, another try or perhaps another approach may find some of them cooperative.

Incapacity or inability may refer to illness which prevents a response during the entire survey period. This may also arise on account of language barrier.

Inaccessibility: Some respondents may be inaccessible. Some may not be found due to migration and other reasons.

Non-responses reduce the effective sample size and its representativeness.

Methods and aims of control of non-response: Kish[4] suggests the following methods to reduce either the percentage of non-response or its effects:

(1) Improved procedures for collecting data are the most obvious remedy for non-response. Improvements advocated are (a) guarantees of anonymity, (b) motivation of the respondent to cooperate, (c) arousing the respondents' interest with clever opening remarks and questions, (d) advance notice to the respondents.

(2) Call-backs are most effective way of reducing not-at-homes in personal interviews, as are repeated mailings to no-returns in mail surveys.

(3) Substitution for the non-response is often suggested as a remedy. Usually this is a mistake, because the substitutes resemble the responses rather than the non-responses. Nevertheless beneficial substitution methods can sometimes be designed with reference to important characteristic of the population. For example, in a farm management study, the farm size is an important variable and if the sampling is based on farm size, substitution for a respondent with a particular size holding by another with the holding of the same size is possible.

Attempts to reduce the percentage or effects on non-responses aim at reducing the bias caused by differences on non-respondents from respondents. The non-response bias should not be confused with the reduction of sample size due to non-response. The latter effect can be easily overcome, either by anticipating the size of non-response in designing the sample size or by compensating for it with a supplement. These adjustments increase the size of the response and the sampling precision, but they do not reduce the non-response percentage or bias.

Telephone Interviewing

Telephone interviewing is a non-personal method of data collection. It may be used as a major method or supplementary method.

Uses: It will be useful in the following situations:

1. When the universe is composed of those persons whose names are listed in telephone directories, e.g., business houses, business executives, doctors, other professionals.

2. When the study requires responses to five or six simple questions, e.g., Radio or Television programme survey.

3. When the survey must be conducted in a very short period of time, provided the units of study are listed in telephone directory.
4. When the subject is interesting or important to respondents, e.g., A survey relating to trade conducted by a trade association or a chamber of commerce, a survey relating to a profession conducted by the concerned professional association.
5. When the respondents are widely scattered and when there are many call backs to make.

Evaluation Advantages: The advantages of telephone interview are:

1. The survey can be completed at very low cost, because telephone survey does not involve travel time and cost and all calls can be made from a single location.
2. Information can be collected in a short period of time. 5 to 10 interviews can be conducted per hour.
3. Quality of response is good, because interviewer bias is reduced as there is no face-to -face contact between the interviewer and the respondent.
4. This method of interviewing is less demanding upon the interviewer.
5. It does not involve field work.
6. Individuals who could not be reached or who might not care to be interviewed personally can be contacted easily.

Disadvantages: Telephone interview has several limitations.

1. It is limited to persons with listed telephones. The sample will be distorted, if the universe includes persons not on phone. In several countries like India only a few persons have phone facility and that too in urban areas only. Telephone facility is very rare in rural areas. Hence, the method is not useful for studying the general population.
2. There is a limit to the length of interview. Usually, a call cannot last over five minutes. Only five or six simple questions can be asked. Hence, telephone cannot be used for a longer questionnaire.
3. The type of information to be collected is limited to what can be given in simple, short answers of a few words. Hence telephone is not suitable for complex surveys, and there is no possibility of obtaining detailed information.

4. If the questions cover personal matters, most respondents will not cooperate with the interviewer.
5. The respondent's characteristics and environment cannot be observed.
6. It is not possible to use visual aids like charts, maps, illustrations or complex scales.
7. It is rather difficult to establish rapport between the respondent and the interviewer.
8. There is no possibility to ensure the identity of the interviewer and to overcome suspicions.

Group Interviews

Meaning and nature: A group interview may be defined as a method of collecting primary data in which a number of individuals with a common interest interact with each other. In a personal interview, the flow of information is multi-dimensional.

The group may consist of about six to eight individuals with a common interest. The interviewer acts as the discussion leader. Free discussion is encouraged on some aspect of the subject under study. The discussion leader stimulates the group members to interact with each other.

The desired information may be obtained through self-administered questionnaires or interview, with the discussion serving as a guide to ensure consideration of the areas of concern. In particular, the interviewers look for evidence of common elements of attitudes, beliefs, intentions and opinions among individuals in the group. At the same time, he must be aware that a single comment by a member can provide important insight.

Samples for group interview can be obtained through schools, clubs and other organized groups.

Uses: The group interview technique can be employed by researchers in studying people's reactions on public amenities, public health projects, welfare schemes, etc. It is a popular method in marketing research to evaluate new product or service concepts, brand names, packages, promotional strategies and attitudes. When an organization needs a great variety of information inasmuch detail as possible at a relatively low cost and in a short period of time, the group interview technique is more useful. It can be used to generate primary data in the exploratory phase of a project.

Evaluation: Advantages: The advantages of this technique are:

1. The respondents comment freely and in detail.
2. The method is highly flexible. The flexibility helps the research work with new concepts or topics which have not been previously investigated.
3. Visual aids can be used.
4. A group can be interviewed in the time required for one personal interview.
5. The client can watch the interview unobserved.
6. Respondents are more articulate in a group than in the individual interview.
7. The technique eliminates the physical limitations inherent in individual interviews.

Disadvantages: This method is not free from draw backs.

1. It is difficult to get a representative sample.
2. There is the possibility of the group being dominated by one individual.
3. The respondents may answer to please the interviewer or the other members in the group.

Nevertheless, the advantages of this technique outweigh the disadvantages and the technique is found to be useful for surveys on topics of common interest.

MAIL SURVEY

Definition

The mail survey is another method of collecting primary data. This method involves sending questionnaires to the respondents with a request to complete them and return them by post. This can be used in the case of educated respondents only. The mail questionnaires should be simple so that the respondents can easily understand the questions and answer them. It should preferably contain mostly closed-end and multiple-choice questions so that it could be completed within a few minutes.

The distinctive feature of the mail survey is that the questionnaire is self-administered by the respondents themselves and the responses are recorded

by them, and not by the investigator as in the case of personal interview method. It does not involve face-to-face conversation between the investigator and the respondent. Communication is carried out only in writing and this requires more cooperation from the respondents than does verbal communication.

Procedure

The researcher should prepare a mailing list of the selected respondents by collecting the addresses from the telephone directory of the association or organization to which they belong.

A covering letter should accompany a copy of the questionnaire. Exhibit of the next page is a copy of a covering letter used by the author in a research study on 'Corporate Planning.' It must explain to the respondent the purpose of the study and the importance of his cooperation to the success of the project. Anonymity may be assured.

BANGALORE UNIVERSITY DEPARTMENT OF
COMMERCE AND MANAGEMENT STUDIES

Dr. O.R. Krishnaswami
City Campus,
Professor and Chairman
Bangalore-560 001

19...

Dear respondent,

My we ask you a favour that takes only a few minutes of your time?

We are conducting a study of Corporate Planning in Public and Private sector enterprises in India with a view to knowing the status of this managerial function in India.

We solicit your cooperation in completing the enclosed questionnaire. Your reply will be kept strictly confidential, of course, and the result of the study will be shown in statistical form only.

At your earliest convenience, please return the completed questionnaire in the enclosed self-addressed stamped envelope.

We thank you for your cooperation.

Sincerely yours,
O.R. KRISHNASWAMI

Encl: 2

A Covering Letter used for a Study on 'Corporate Planning'

The sponsor's identity may be revealed. However when such information may bias the results, it is not desirable to reveal it. In the later case, a disguised organization name may be used.

A self-addressed stamped envelope should be enclosed in the covering letter.

After a few days from the date of mailing the questionnaires to the respondents, the researcher can expect the return of completed ones from them. The progress in return may be watched and at the appropriate stage follow-up efforts can be made.

Alternative Modes of Sending Questionnaires

There are some alternative methods of distributing questionnaires to the respondents. They are: (1) personal delivery, (2) attaching questionnaire to a product. (3) advertising questionnaire in a newspaper of magazine, and (4) news stand inserts.

Personal delivery: The researcher or his assistant may deliver the questionnaires to the potential respondents with a request to complete them at their convenience. After a day or two he can collect the completed questionnaires from them. Often referred to as the self-administered questionnaire method, it combines the advantages of the personal interview and the mail survey.

Alternatively, the questionnaires may be delivered in person and the completed questionnaires may be returned by mail by the respondents.

Attaching questionnaire to a product: A firm test-marketing a product may attach a questionnaire to a product and request the buyer to complete it and mail it back to the firm. The respondent is usually rewarded by a gift or a discount coupon.

Advertising the questionnaire: The questionnaire with the instructions for completion may be advertised on a page of a magazine or in a section of newspapers. The potential respondent completes it tears it out and mails it to the advertiser. For example, the committee on Banks Customer Service used this method for collecting information from the customers of commercial banks in India. This method may be useful for large-scale on topics of common interest.

News-stand inserts: This method involves inserting the covering letter,

questionnaire and self-addressed reply-paid envelope into a random sample of newsstand copies of a newspaper or magazine.

Improving the Response Rate in a Mail Survey

The response rate in mail surveys is generally very low,. More so in developing countries like India. Certain techniques have to be adopted to increase the response rate. They are:

1. ***Quality printing:*** The questionnaire may be neatly printed in quality light coloured paper so as to attract the attention of the respondent.
2. ***Covering letter:*** The covering letter should be couched in a pleasant style so as to attract and hold the interest of the respondent. It must anticipate objections and answer them briefly. It is desirable to address the respondent by name.
3. ***Advance information:*** Advance information can be provided to potential respondents by a telephone call or advance notice in the newsletter of the concerned organization or by a letter. Such preliminary contact with potential respondents is more successful than follow-up efforts.
4. ***Incentives:*** Money, stamps for collection and other incentives are also used to induce respondents to complete and return mail questionnaires.
5. ***Follow-up-contacts:*** In the case of respondents belonging to an organization, they may be approached through some one in that organization known to the researcher.
6. ***Larger sample size:*** A larger sample may be drawn than the estimated sample size. For example, if the required sample size is 1000, a sample of 1500 may be drawn. This may help the researcher to secure in effective sample size closer to the required size.

Evaluation of Mail Surveys

Advantages: The advantages of mail surveys are:

1. They are less costly than personal interviews, as cost of mailing is the same throughout the country, irrespective of distances.
2. They can cover extensive geographical areas.
3. Mailing is useful in contacting persons such as senior business executives who are difficult to reach in any other way.

4. The respondents can complete the questionnaires at their conveniences.
5. Mail surveys, being more impersonal, provide more anonymity than personal interviews.
6. Mail surveys are totally free from the interviewers bias, as there is no personal contact between the respondents and the investigator.
7. Certain personal and economic data may be given more accurately in an unsigned mail questionnaire.

Disadvantages: The disadvantages of mail surveys are:

1. The scope for mail surveys is very limited in a country like India where the percentage of literacy is very low.
2. The response rate of mail surveys is low. Hence, the resulting sample will not be a representative one.
3. It is also difficult to determine the degree of representativeness of a sample obtained by mail.
4. The causes for inadequate and non-responses cannot be known, and no probing is possible.
5. Information on the personal characteristics of the respondent and his environment cannot be secured.
6. Respondents may not cooperative if the mail questionnaire is long or complex.
7. Several returned questionnaires may contain unanswered questions and incomplete responses.

CONSTRUCTION OF SCHEDULES AND QUESTIONNAIRES

Schedule Vs. Questionnaire

Schedules and questionnaires are the most common instruments of data collection. These two types of tools have much in common. Both of them contain a set of questions logically related to a problem under study; both aim at eliciting responses from the respondents; in both cases the content, response structure, the wordings of questions, question sequence, etc. are the same for all respondents. Then why should they be denoted by the different terms: 'schedule' and 'questionnaires"? This is because the methods for which they are used are different. While a schedule is used as a tool for interviewing, a questionnaire is used for mailing.

This difference in usage gives rise to a subtle difference between these two recording forms. That is, a schedule is filled by the interviewer in a face-to-face interviewing, whereas a questionnaire is filled in by the respondent himself. Hence the need for using two different terms..

The tool is referred to as a schedule when it is used for interviewing; and it is called a questionnaire when it is sent to a respondent for completion and return.

The Process of Construction

The process of construction of a schedule and a questionnaire is almost same, except some minor differences in mechanics.

This process is not a matter of simply listing questions that comes to researcher's mind. It is a rational process involving much time, effort and thought. It consists of the following major steps:

1. Data need determination: As an interview schedule or a mailed questionnaire is an instrument for gathering data for a specific study, its construction should flow logically from the data required for the given study. Hence the data need determination is the first step in the instrument design process. How the data requirement can be determined?

The data required for a specific study can be determined by a deep analysis of the research objectives, the investigative questions relating to each of the research objectives, hypothesis, and the operational definitions of the concepts used in them.

What data are required to answer the research questions and to test the hypothesis? What questions should be put to the respondents to elicit these data?

The outcome of this exercise in analytical reasoning depends upon researcher's perception of the research problem and his insight into it. If he has no thorough knowledge of the full dimensions of the subject, then it is necessary to do an exploratory 'pilot study' to gain it.

2. Preparation of 'Dummy' tables: We are concerned with adequate coverage of the information required for the study and also with securing the information in the most usable form. The best way to ensure these requirements is to develop "dummy" tables in which to display the data to be gathered. The adequacy of the dummy tables for describing the possible distributions or relationship related to the problem or hypothesis should be examined. This will help to identify gaps and duplications in the instrument and enable the designer to make appropriate additions, corrections and deletions.

3. Determination of the respondents' level: Who are our respondents? Are they persons with specialized knowledge relating to the problem under study? Or are they lay people? What is their level of knowledge and understanding? The choice of words and concepts depends upon the level of the respondents' 'knowledge.'

4. Data gathering method decision: At this stage we must choose the method of collection of data to be used. Which communication mode is most appropriate - face-to-face interview or mailing? The choice of question structure depends largely on the communication mode chosen. For example, it is necessary to use structured questions for a mail survey, to the extent possible.

5. Instrument drafting: After determining the data required for the study, first, a broad outline of the instrument may be drafted, listing the various broad categories of data. For example, the outline of a questionnaire for a survey of consumer behaviour towards colour televisions may consist of such sections as (a) Identification data, (b) Brand awareness, (c) Brand choice, (d) Purchase decision, (e) Brand loyalty, (f) Post-purchase behaviour, and (g) Personal information.

Second, the sequence of these grouping must be decided. They must be arranged in a logical order – For example, in the questionnaire outline given above 'brand choice' cannot precede 'brand awareness,' because the choice is made out of brands known.

Third, the questions to be asked under each group heading must be listed. All conceivable items relevant to the 'data need' should be compiled. The goal of this listing is to ensure that all questions that are required to obtain the needed data are compiled. In compiling his draft, the content, wording and other aspects should be considered.

6. Evaluation of the draft instrument: In consultation with other qualified persons, the researcher must rigorously examine each questions in the draft instrument. This evaluation may be done in terms of the following criteria:

(a) The relevance of each question to the research objectives and investigative questions.

(b) The appropriateness of the type of question: open ended or structured.

(c) The clarity and unambiguity of the question.

(d) The practicability of the question: i.e., it should not demand knowledge and information that the respondent does not possess, it should not test his memory span and also should not embarrass him.

(e) The validity of the question: i.e., it should not be a leading or loaded question.

The logical and psychological order of the questions, their clarity and content, and the length of the instrument and other aspects of its structure should also be considered. The length of the questions is likely to influence the response rate and test-weary level, but the length in itself need not be the guiding factor in the design. The important consideration is that the instrument adequately covers the subject, but does not include irrelevant items.

In the light of the above evaluation, the draft instrument should be revised.

7. Pre-testing: The revised draft must be pre-tested in order to identify the weaknesses of the instrument and to make the required further revisions to rectify them.

8. Specification of procedures/instructions: After the instruction is finalized after pre-tests, the procedures or instructions, relating to its use must be specified. If the instrument is an interview schedule, then it is necessary to specify the procedures for its use. This specification is one way to ensure that different interviewers will deal with specific questions in a standardized manner. The definitions of concepts and variables should be given. The procedure for recording responses and approaches to deal with various interview situations must also be specified. The efficiency of field handling is the operating consideration in the case of an interview schedule. If the instrument is meant for mail survey, instructions regarding the mode of answering should be specified at the top of the first page. The anonymity should be assured. A good covering letter should also be drafted.

The questionnaire itself should be carefully and clearly laid out, using bold types and capitals to emphasize particular words and instructions. It should be neatly printed in quality paper, as the primary consideration in questionnaire design is attractiveness and clarity.

9. Designing the format: The format should be suited to the needs of the research. The instrument should be divided into different sections relating to the different aspects of the problem. Each section heading should be printed in thick/bold letters. There must be more space for the answer of each open-ended question. There should be space between one question and another so that the interviewer/respondent will not easily confuse the line from which he is reading.

There may be questions for which answers are 'yes' or 'no.' If the respondent answers yes' to such a question, then a series of questions is offered, which is different from the series offered to 'no' answer. Such series must be set off spatially by indentation, asterisks or some other technique, so that there is no confusion between the two series.

Question Construction

A survey instrument - interview schedules or questionnaire - is useful for collecting various types of information, viz, (a) factual information - facts about the respondents: sex, age, marital status, education, religion, caste or social class, income and occupation; and facts about events and circumstances, (b) psychological information such as attitudes, opinions, beliefs, and expectations, and (c) behavioural information, like social participation, and so on.

Once the information needed is determined as explained in the previous topic we can begin question construction. This involves four major decision areas. They are: (a) question relevance and content, (b) question wording, (c)response form, and (d) question order or sequence.

Question Relevance and Content

Any question to be included in the instrument should pass certain tests. Is it relevant to the research objectives? Can it yield significant information for answering an investigative question? If not, it should not be included in the instrument.

If a question passes the relevance test, we should then consider its coverage. Is it of proper scope? If it covers two separate ideas, then it is a double-barreled question requiring splitting. An example of this type of question is: Are you satisfied with the service conditions and the promotional policy of your employer? It is better to break this into two separate questions.

Another test of coverage is: Does the question provide the information needed to interpret the response fully? If we have to ask about the operational efficiency of X enterprises, a single question about it cannot provide adequate information to judge the operational efficiency. We should ask several questions on the various dimensions of this variable.

Another test is to consider whether the respondents know the answer to the question. Respondents may prefer to give some answer even if they are not aware of a topic. General public cannot be expected to know the correct meanings of technical concepts, like net reproductive rate, Sanskritization, social structure, gross margin, gross block, etc. The question designer should

consider the respondent's information level when determining the content and appropriateness of a question. A question should not call for more information than the potential respondent's ability and willingness to provide.

A question should not overtax the respondent's recall ability. Most of us cannot recall much that has happened in the past. This limitation should be kept in mind in framing questions on past events.

Another aspect of adequacy relates to a balance between generality and specificity. For example, to ask about average annual movie attendance is an unrealistic demand for generalization. It may be better to ask about attendance for the last month.

The main difficulties with factual questions are to ensure that they are understandable and convey to the respondents precisely what facts are wanted.

The difficulties with opinion questions are much more fundamental. A person's opinion on any issue is many-sided. For example, opinions on 'sati,' there are moral, religious, legal, social and other aspects. There is also the problem of intensity. To estimate the opinions on an issue, an opinion statement may be given and the respondents may be asked to say whether they agree with it or not. Alternatively, a number of opinion statements may be given and the respondents may be asked to check the particular statement which best describes their opinion.

However, if their attitudes have to be measured an attitude scale has to be constructed.

The most important guideline for asking about behaviours of respondents is that the question should be specific. For example, Questions like "what brand or brands of coffee do you have in the house today? Do you usually buy that brand?" are preferable to a more general question like "what brand of coffee do you usually use?

Finally, it must be determined whether questioning would secure the required information or not. If we find that through questioning we cannot succeed in securing the needed information, we should think of other alternatives. For example, in a survey of magazines read by respondents, an unusually high rate was reported for prestige magazines and an unusually low rate for pulp magazines. The method of data collection as changed: Instead of interviewing the respondents, they were asked to contribute their older magazines to a charity drive. This collection gave a much more realistic estimate of readership of both types of magazines.

Question Wording

This is a difficult task. The function of a question in a schedule/ questionnaire is to elicit a particular information without distortion. "Questioning people," says Oppenheim, is more like trying to catch a particular elusive fish, by hopefully casting different kinds of bait at different depths, without knowing what goes on beneath the surface." As the meaning of words differs from person to person, the question designer should choose words which have the following characteristics:

(a) ***Shared vocabulary:*** The collection of data is ultimately an exchange of ideas between the investigator and the respondent. The exact understanding between them calls for the use of vocabulary common to both parties. Each must understand what the other says. Each word should mean the same thing to all respondents.

(b) ***Exactness:*** The words should be exact or precise, reflecting what the question content is intended to mean. Such words as 'small,' frequently,' 'good,' 'beautiful,' and 'usually,' are intrinsically vague and should be avoided in favour of numerical ranges when possible. Even a word like income' should be stated exactly as 'family income per month' or individual income per month.

(c) ***Simplicity:*** The words should be simple. Many commonly used words like 'nationality,' 'marital status, 'bureaucrat' are frequently misunderstood. Such words should be avoided and simpler equivalents used or clarified in detail. For example, a question worded as "What is your marital status?" may elicit feelings about marital life or marital problems. It is better to word it as Are you currently married, widowed, divorced" or separated or unmarried?

Similarly, the questions should also be simple. Instead of designing a single complex question on a complicated subject it is desirable to compile a series of simple questions.

(d) ***Neutrality:*** Words that cause undue influence of prestige or bias can result in inaccurate answers. Suppose we ask a customer "would you patronize a high-class aristocratic café?" This practically would force the respondent to answer in a certain way. Such wordings should be avoided. The words to be used must be neutral ones, i.e., free from the distorting influence of fear, prestige, bias or emotion.

Certain other problem areas of question wording are:

(a) ***Unwarranted assumptions:*** The questions designer should not assume that the respondents know or understand key words or phrases or abstract concepts. Unless words have concrete referents, their meanings are too vague for a research tool. Example of such words are 'business,' 'society,' 'culture' and 'social justice.'

(b) ***Personalization:*** It is necessary to decide whether a question should be worded in a personalized form or not; should we ask "what would you do about...?" The responses to personalized and impersonal questions will vary. We should choose that form which is likely to present the issue more realistically. Indirect questioning is widely used for opinions in sensitive topics. It is likely that the respondent will reply in terms o his on attitudes and experiences.

(c) ***Presumptions:*** Questions should not presume anything about the respondent. They should not imply that he engages in the activity about which he is being asked or necessarily possesses any knowledge on the survey matter. Questions like: "How many times a day do you drink coffee?" or "Are you satisfied with the performance of your colour TV?" should be preceded by a filter question: "Are you used to drink coffee everyday?" or "Do you have a colour TV in your house? As the case may be.

(d) ***Hypothetical question:*** Hypothetical questions like: "Would you like to...?" or "What would you do if....?" Are of very little value to predict behaviour?

(e) ***Embarrassing questions:*** People do not like to discuss in public private matters or to admit socially unacceptable behaviour and attitudes. For example, many respondents would probably refuse to answer or distort their answers to questions on premarriage sexual experience, frequency of taking a bath, or cheating in examination and the like.

Some of the approaches to deal with this problem are: (i) to express the question in the third person; instead of asking the respondent for his views, he is asked about the views of others: (ii) to use a drawing of two persons in a certain setting with 'balloons' containing speech coming from their mouths, as in a cartoon - leaving one person's balloon empty and asking the respondent to put himself in the position of that person and to fill in the missing words; and (iii) to use sentence completion tests.

The question designer should be aware of question wording problems and take every care to develop unbiased and unambiguous questions. After developing them, he should test and revise them two or more times in order to improve the quality of their wordings. The general rules are that questions should be brief and simple, without compound phrases; they should be clear, having few or no adjectives; and they should be positive rather than negative.

Response Form or Types of Questions

The third major area in question construction is the types of questions to be included in the instrument. They may be classified into open questions and closed questions. Closed questions may be dichotomous, multiple choice or declarative ones.

Determinants: The choice between open and closed questions depends on the situation. Kahn and Cannel[6] point out five situational factors that determine this decision.

They are:

(1) Objectives of the interview,

(2) Respondent's level of information about the topic,

(3) Respondent's thinking through the topic,

(4) Ease of communication and motivation of respondent to talk, and

(5) The investigator's awareness of the above factors.

If the objective of interview/mailing is to classify the respondents' characteristics/view points is into some specific categories, then the closed form of question is preferable. For example, the age of the respondents may be structured as 'up to 20 years, 20 to 40 years, 40 to 60 years; and 60 years and above.' Open questions are appropriate when the objective is to discover opinions and degrees of knowledge, or to seek suggestions and more information.

When the subject matter of a question is likely to be outside the range of the respondent's experience, the open questions may be the better way to learn his level of information. Open questions are also preferable for determining the depth of feelings and expressions of intensity. Where the respondent has not yet thought through the topic, an open question may give him a chance to think through it. Closed questions require less motivation than open ones

Finally, it is better to use open questions when the investigator has no clear idea of respondents' level of information. This situation is likely tc prevail in exploratory research or the pilot stage of a study.

Open-ended questions: These are unstructured ones, providing free scope to the respondents to reply with their own choice of words and ideas, e.g., what you propose to do after graduation? Open responses are useful in studies where discovery is the objective. Response freedom encourages a variety of frames of references which may provide unanticipated insights.

Open questions of general type may be included in the opening part of the tool in order to arouse the interest of the respondents. Open questions are also useful to start a depth interview. However, they make compilation and classification of responses difficult.

Closed questions are structured ones with two or more alternative responses from which respondent can choose. They contain standardized answers and they are simple to administer and easy to compile and analyze. As the alternative responses are designed with reference to the requirements of the study, the chances of securing relevant answers are better.

However, closed questions suffer from certain disadvantages. They force a statement of response couched in the researcher's terms rather than the respondent's. The respondent may be led to choose a response, even when he has no knowledge of it, or the limited alternatives may not cover his viewpoints. It is also possible that different respondents will interpret the same words and statements differently.

Dichotomous or two-choice questions: A dichotomous question can be answered in one of the two responses such as 'yes' or 'no'. For example, 'Do you own a watch'? Yes ____ No. _____. Do you own or rent your house? Own _____ Rent _____. It is necessary to realize that in many two-choice questions there may be potential alternatives beyond the stated two. For example, a respondent may answer 'do not know' or 'no opinion' or even 'in-between', e.g., a question like "Do you propose to buy NS Certificates?" requires three choices: 'yes', 'no' and 'undecided.'

Multiple choice questions: These questions contain more than two alternatives, e.g., Why have you preferred this brand of two wheeler?

- Reasonable price
- Fuel-efficient
- Sturdy
- Riding comfort
- Others (please specify)

The list may not necessarily be all-inclusive. To solve this problem, we should add the category "others (please specify)" to provide for any other options.

The multiple-choice questions should satisfy the following requirements:

1. The list of alternative choices should be exhaustive, i.e., it should contain all the possible choices that the respondents would like to have. The category of "others (please specify)" should be included to provide for unanticipated choices.
2. They should not contain overlapping choices.
3. There should be a fair balance in choices.
4. All alternatives should be reasonable, e.g., in a survey of industrial workers, suppose the following choices are presented under "What is your monthly total wages?"

   - upto Rs. 1,000
   - Rs. 1,001 to Rs. 2,000
   - Rs. 2,001 to Rs. 3,000
   - Rs. 3,001 to Rs. 5,000
   - Rs. 5,001 to Rs. 10,000
   - Rs. 10,001 and above.

   It is obvious that the last three choices are not reasonable in the light of our general knowledge about industrial wages in India.
5. The choices should be logically consistent, i.e., they should not mix-up causes and effects, e.g., in your opinion what are the two main causes for industrial sickness?

   - (a) inefficient management
   - (b) inadequate capital
   - (c) obsolete technology
   - (d) technical insolvency
   - (e) others, please specify.

   Item (d) is the effect of (b), and hence not consistent.
6. The choices should be conceptually unidimensional, i.e., they should refer to the different aspects of the same conceptual dimension,

e.g., for a question relating to low labour productivity, the list of alternatives should not include items like (a) insufficient capital, (b) lack of demand for the product, and (c) severe competition which represent conceptual dimensions different from "labour productivity."

The actual process of designing satisfactory alternative responses to multiple choice questions calls for repeated pre-tests and revisions.

Declarative questions: A declarative question is a type of multiple choice question in which a series of statements about a given subject is given. The respondent is asked to check one of them which represents his view, e.g.,

Which of the following statements best describes your company's philosophy?

- A business firm is responsible for making a profit and helping to solve social problems which it may directly create.
- A business firm is responsible for making profit while abiding by legal requirements.
- In addition to making profit, a firm should help to solve social problems, as long as there is some profit potential.
- In addition to making a profit, a firm should help to solve social problems around it, even if there is probably no profit potential.

When the responses are best expressed in degrees of agreement or disagreement or like or dislike, the declarative form should be considered.

Types of Questions to be Avoided

The question designer should avoid the following types of questions:

(a) ***Leading questions:*** A leading question is one that is worded in such a way as to influence the respondent to give a certain answer. It does not elicit an accurate answer or correct view point of the respondent. Examples of leading questions are:

"Are you against giving too much power to the trade unions?"

"You would like to own a new Maruthi Car, wouldn't you?"

"Don't you think that yesterday's T.V. drama was thrilling"?

"Do you think that the Government should get involved in...?"

(b) ***'Loaded' questions:*** A 'loaded' question is one that contains words which are emotionally coloured and suggests an automatic feeling of

approval or disapproval. Words such as 'starvation', 'bureaucracy', 'terrorist,' etc., make respondents react not so much to the issue posed by the question as to the loaded phrase itself. Consider the following two questions: "Mahatma Gandhi has always advocated religious harmony. Do you think that we should maintain religious harmony?" and "Fundamentalists have advocated religious harmony. Do you think we should maintain religious harmony?" These two questions are loaded in different directions. More respondents will tend to agree with the first. Another example: "Have you ever tried to get special favours from a business establishment by pressuring them? Yes _____ No _____." The respondent cannot answer 'yes' without putting himself in a bad light.

(c) ***Ambiguous questions:*** An ambiguous question is one that does not have a clear meaning. It may mean different things to different people, e.g., Are you interested in a small house? What does the word 'interested' mean: to own or to hire? What does the word 'small' mean?

(d) ***Double-barreled questions:*** "They contain two or more different ideas or references, e.g., Do you favour or oppose increased job security and productivity-linked wage system? This should be split up into two questions: (1) Do you favour or oppose increased job security? (2) Do you favour or oppose productivity-linked wage system?

(e) ***Long questions:*** When questions become long they often become ambiguous and confusing. For example, the question "Do you have any impairments or handicapped conditions, even though they may not interfere with your usual activities?" causes confusion. It can be split into two points.

(f) ***Avoid double negative:*** A question with a double negative will cause confusion. Hence, double negative construction should be avoided.

Question Order or Sequence

The order in which questions are arranged in a schedule/questionnaire is as important as question wording. It has two major implications. First, an appropriate sequence can ease the respondent's task in answering. Second, the sequence can either create or avoid bias due to context effects, i.e., the effects of preceding questions on the response to later questions.

Should the sequence decision be determined by the research process (i.e., the needs of analysis) or by the logic of the respondent? The nature and

needs of the respondent must determine the sequence of questions and the organization of the schedule. This is the basic principle governing sequence decision.

Emory suggests the following guidelines[5] to implement this principle of respondent orientation:

1. The question process must quickly awaken respondent's interest and motivate him to respond willingly and fully.
2. The respondent should not be confronted by early requests for personal information.
3. The questioning process should begin with simple items and move to the more complex, and from general items to the more specific.
4. Changes in frame of reference should be minimal and should be clearly pointed out.

In other words, there should be a logical progression[6] such that the respondent is (1) drawn into the questioning process by awakening his interest, (2) not affronted by an early and sudden request for personal information, (3) easily brought along items which are simple to answer to those which are complex, (4) never asked to give an answer which could be embarrassing without being given an opportunity to explain, and (5) brought smoothly from one frame of reference to another rather than made to jump back and forth.

The question sequencing has two dimensions: (1) overall sequence, i.e., the sequence among topical areas within the instrument, and (2) intra sequence, i.e., sequence within a topical area.

Overall sequence: The researcher is a stranger to respondents, and the latter are under no obligation to oblige. They may also have some doubts about their competence to answer research questions. Therefore, the investigator's first challenge is to awaken the respondents' interest in the study and motivate participation. In order to bring this about, the instrument should begin with attention-catching non-controversial and simple but interesting questions. If these questions have human interest value so much the better. In fact, the first few questions may set the tone of the entire questioning process.

Two forms of error are common in this respect. One is the common practice of beginning the instrument with easy-to-answer background information like age, education, religion, occupation, marital status etc. This practice is not correct, because people do not normally like to furnish such data to a

stranger. These items should be put at the end. At that stage respondents are ordinarily more willing to give such personal information, and even if they are not, nothing much would be lost, as data on vital items would have been furnished.

Another practice of listing private or sensitive questions at the start is also dangerous. Then more respondents will either refuse to answer or furnish incorrect or evasive responses.

Some examples of reasonable opening questions are given below:

(i) (For a study involving household financial matters): "There has been a lot of talk about rising prices. We are interested in knowing how people are getting along financially these days. To what extent your financial position has been hit by rising prices? - Very much, somewhat, not too much or not at all?"

(ii) (For a study involving dealership survey): "There has been much talk about industrial deregulation and the emerging competitive market situation. It is said that industrial marketing has become highly challenging. We are interested in knowing how long-standing dealers like you manage this challenging task. How do you find this emerging scenario? Highly competitive, moderately competitive? Is it both an opportunity and a challenge?"

Questions like these may invoke the respondent's interest, put him at ease and build up his confidence and motivate his participation.

Following a few general initial questions of the sort just described, the main questions should be arranged in a logical manner, moving from topic to topic.

The principle of logical progression should be followed in arranging the topics, i.e., to place simple topics first and to move progressively to more complex ones and sensitive topics may be kept at the end.

Questions related to a particular topic should be kept together. The respondents are confused and angered if questions skip around from topic to topic, as when one question about tax policy, the next about job satisfaction and the next about investment preference. The respondent's comprehension and ability to answer the questions will be facilitated by keeping topically related questions together. Moreover each topic area should be linked in the respondent's mind to the overall purpose of the study. Questions with no connection to the topic are bound to arouse suspicion and resentment.

The next aspect is transition from one topic to another. This transition should be smooth and meaningful. Where one topic ends, it is advisable to give a sentence or two indicating the break and the relevance of the new topic to the study purpose. Such transitional statements should be simple and appropriate, e.g., (1) "We have been talking so far about your profession. Now I would like to learn about your association with social organisation." (2) "An important part of understanding people's attitude towards social security has to do with their feelings about achievement from work. So next I would like to ask some questions about your thoughts and plans on retirement." To introduce the personal background items like age, education, income etc., the following transitional statement may be used:" In study of this type, it is desirable to compare the people's opinions, or attitudes with their characteristics like age, religion, education etc. So finally I would like to ask some questions about yourself to help interpret the study results." Sensitive questions demand particular attention to transitions to ensure that respondents understand their relevance to the research purpose.

Where the schedule/questionnaire is long, the problem of respondent fatigue will arise. This usually sets in within a period of 15 to 20 minutes or after about 90 items. When the respondent experiences fatigue, he may fail to recall the latter items and hence give negative or 'don't know' responses. The best solution to this problem is to have more than one sitting with the respondent at his convenience.

Intra sequence: There are two general patterns in arranging the questions within a specific topical area. They are: the funnel sequence and the inverted funnel sequence. The funnel sequence refers to the procedure of listing the most general question first and following it with increasingly specific and detailed questions. The general question introduces the general subject and from the respondent's answer to it, we can probably infer his frame of reference. Each successive question is related to the previous question and it is progressively more specific. For example, if one were interested in finding out how the job and working conditions influence workers' attitude towards, wage structure, the following questions can form a funnel sequence: (1) "What is the job you hold? (2) What are the activities involved in it? (3) Do you find your job pleasant or tedious? (4) Under what working conditions do you perform those activities? (5) Do you find the working conditions conducive to work? (6) What is the wage structure pertaining to your job? (7) Do you find it commensurate with the nature of the job and working conditions?"

The objective of funnel approach is to learn the respondent's frame of reference and to extract the full range of desired information without the distortion effect of earlier questions on latter ones.

In the inverted funnel sequence, narrower questions are followed by broader ones. If the purpose is to obtain a generalization in the form of a judgement regarding a concrete situation, and it seems that the respondents do not hold considered opinions about it, then it is helpful to begin with specific questions which are easier to answer, and in answering them, the respondent is led towards forming a considered opinion on the broad question.

Another requirement in arranging questions is to avoid context effects, i.e., the influence of one question on another. For example, in a survey made for determining the relative popularity of a certain brand of a product, if an earlier question mentions the name of that brand or in any way indicates that the makers of that brand are interested in the findings, all the answers to the remaining questions are likely to be biased towards favouring that brand, because, ordinarily respondents would prefer to be pleasant to the investigator. Such sequence effect should be kept in mind in arranging questions. Any question that will prejudice the answers of other related questions should not precede the latter.

Check list: Kornhauser[9] has prepared a useful checklist of points to be considered while evaluating the questions constructed. An outline of those points is given below:

Questions Content

Is this question necessary for clear understanding; just how will it be used?

Are several questions needed on the subject matter of this one question?

Do the respondents have the information necessary to answer the question?

Does the question need to be more concrete, more specific and more closely related to respondent's experience?

Is the question content sufficiently general and free from spurious concreteness and specificity?

Is the question content biased or loaded in one direction - without accompanying questions to balance the emphasis?

Question Wording

Do the questions contain difficult or unclear phrases tending toward misunderstanding?

Do the questions adequately express the alternatives with respect to choices of responses?

Are the questions misleading by reason of unstated assumptions or unseen implications?

Is the wording biased? Is it emotionally loaded?

Is the question wording likely to be objectionable to the respondents?

Would a more personalized or less personalized wording of the question produce better results?

Can the question be better asked in a more direct of more indirect form?

Question Sequence

Are the answers to the questions likely to be influenced by the content of the preceding questions?

Are the questions led up to in a natural way? Are they in correct psychological order?

Do some questions come too early or too late from the point of view of arousing interest and receiving sufficient attention, avoiding resistance and inhibitions?

In the light of the above evaluation, the draft questions should be revised and improved.

Reason Analysis

The construction of questions to determine the 'reasons for' an action or opinion poses a challenge to the question designer. A simple "Why" question, though easy to use, is totally inadequate for the purpose. One effective approach for determining causal factors is 'reason analysis.' This is defined as "a set of procedures used in survey research to construct a causal explanation for the actions, decision, or intentions of individuals."[10] Reason analysis can be used in studying the subjective factors in any course of individual action.

To employ reason analysis, a researcher must analyze the research objectives and the type of actions of opinion under study. In the context of

this analyst he should set up an accounting scheme. This scheme is an organized list of factors that are believed to be relevant causes or influences upon some action, opinion or intention. Zeisel refers to these factors as "dimensions of the action or attitude under study."[11] For example, purchase propositions can be analyzed with a three-dimension accounting scheme: (1) respondent's motives prior to the decision to buy, (2) attributes of the product - its quality, its usefulness, price etc., (3) influences that affect the course of the decision.

The accounting scheme must reflect the specific objectives of the study and also include the time element. Questions, then, may be designed covering the various dimensions of the accounting scheme. When done in this manner, substantial causal information can be secured.

Mechanics of the Schedule and Questionnaire

In addition to question wording and question construction, the mechanics of the form should also be considered in the design of a schedule/questionnaire. The mechanics of the form has several aspects; items of the form, instruction, pre-coding, sectionalization, spacing, paper, printing, margins, etc.

Items of the form: The following items are mandatory for schedules and questionnaires.

1. The name of the organization collecting the data should appear at the top of front page. The name of the sponsor, of the study, if any should also be shown. If the instruments are to be returned by mail, the address to which they are to be sent must be clearly specified.
2. The title of the study should appear in large print next to the name of the organization on the first page. Below this title, the title of the tool - e.g., 'Schedule for consumers' - may be noted.
3. The confidentialness of the data should be made clear.
4. A place for writing the date of filling in the form should be provided.
5. A serial number to each copy of the tool may be assigned.
6. The pages of the instrument should be numbered.

Instructions: In the face sheet below the title of the questionnaire, a brief statement of the objective of the study, the confidentialness of the data, and instructions relating to answering the questions may be provided.

Pre-coding: Items in the tool should be pre-coded so as to facilitate transcription of data. For example, items in Section 1 may be numbered as

1.1, 1.2, 1.3 and so on, and in Section 2 as 2.1, 2.2, 2.3.... and so on. Sufficient space may be left for coding the responses to the open-ended questions.

Sectionalization: There should be a separate section for each topical area. For example, a questionnaire for studying the management of distribution channels in an equipment manufacturing industry may consist of sections entitled (1) Production, (2) Marketing channels: General, (3) Company's own Sales outlets, (4) Marketing through Dealers, (5) Marketing through agents, (6) General Information. Section heading may be printed in thick/block letters. Sections should be given serial numbers: 1, 2, 3...and so on.

As noted earlier, in order to make the shift from one section to another, it is desirable to insert transitional statements, such as "we have been talking about..., now, would you mind letting me ask a few questions about...?" Any such statements should be set off spatially or a different type face used, in order to draw the attention of the interviewer/respondent to the item.

Spacing: For each open-ended question, an adequate space should be provided for answer. There should be indeed more space than seems necessary, for some interviewers/respondents may write in a large script for legibility. Moreover, liberal spacing is a stimulus for the questionnaire respondent to write more fully. Even short-answer questions should be spaced, so that the interviewers/respondent will not easily confuse the line, from which he is reading.

At times, there are additional facts to be recorded after the interviewers leave the respondent: the type of dwelling or neighbourhood, the respondent's response, etc. For recording such items of information in a systematic manner the face sheet or end sheet of the schedule may be set aside. In the case of a mailed questionnaire, in the end sheet space may be provided under 'General remarks' with a note: "Please furnish any other information relevant to the study."

Paper: The paper used for mimeographing/printing should be of good quality.

Printing: Mailed questionnaire should necessarily be printed in order to make it attractive and to minimize the postal expenditure. If a large number of copies are required, then even interview schedule may be printed. Printing has its own advantages. The letter size and colour may be varied in printing with advantageous effects. For example, section headings, could be printed in bold-type, questions in one colour, instructions in another colour and so on.

Margins: One inch margin on the left side of the sheet and one-half inch margin on other sides may be provided. If the instrument is to be bound, left-side margin should conform to the type of binding used.

Indentation: This is required for 'yes' or 'no' questions. If the respondent's answer is 'yes', then a series of questions is offered. If the answer is 'no' a different series of questions is offered. Such series must be set off spatially as under:

If yes then please answer the following questions.

If your answer is 'No' to Question...

The above demarcation avoids confusion between the two series.

Note of thanks: A final note or comment of thanks for the cooperation of the respondent should be included at the end of the instrument.

Concluding Remarks

Question designing remains primarily a matter of common sense and experience and of avoiding known pitfalls, as there are no hard and fast rules relating to it. Hence, alternative versions of questions must be rigorously tested in pre-tests. Test-revision-retests play a crucial role in questionnaire construction.

Summary of Characteristics of a Good Schedule/ Questionnaire

The construction and use of schedules and questionnaires has been discussed at length in this and the preceding chapter. A summary of the main characteristics of a good schedule/questionnaire is given below:

1. It asks for and obtains all the information required for achieving the research objectives.
2. It contains questions relevant to the study and does not include any irrelevant and unimportant questions.
3. It does not aim at obtaining any information which can be more accurately and effectively obtained by other data-gathering methods like observation.
4. It contains no questions that are unclear, ambiguous, double, leading, loaded or uninformative, and long.
5. It contains no open-ended or discussion questions unless they are absolutely necessary.

6. It does not contain questions which are beyond the memory span of respondents.
7. It contains questions that can be answered as quickly and easily as possible.
8. It avoids unwarranted presumptions about the respondents.
9. It does not restrict the choices of answers so as to bias or distort replies to be given.
10. Choices to closed questions are adequate, reasonable, unidimensional and logically consistent.
11. Each question is limited to a single idea or single reference.
12. No embarrassing questions are given without providing an opportunity to explain.
13. Appropriate balance between personalization and indirect form is maintained.
14. Filter questions are used wherever necessary.
15. Topics and questions are arranged in a logical and psychological sequence that is natural and easy for the respondent.
16. Transition between one section and another is smooth.
17. Inter-related questions are so positioned as to avoid context effects.
18. Questions seeking 'reasons for' are based on reason analysis.
19. Questions and alternative answer choices are properly coded.
20. Design requirements like margin, spacing etc. are taken care of.
21. Appropriate introduction and instructions are included.
22. The instrument has been adequately pre-tested and revised so as to be a satisfactory tool for the particular survey.

TABULATION

The transcription of data can be used to summarize and arrange the data in a compact form for further analysis. The process is called tabulation. Thus, tabulation is a process of summarizing raw data and displaying them on compact statistical tables for further analysis. It involves counting the number of cases falling into each of the categories identified by the researcher.

Tabulation can be done manually or through the computer. The choice depends upon the size and type of study, cost considerations, time pressures and the availability of software packages. Manual tabulation is suitable for small and simple studies.

Manual Tabulation

When data are transcribed in a classified form as per the planned scheme of classification, category-wise totals can be extracted from the respective columns of the work sheets. A simple frequency table counting the number of "Yes" and "No" responses can be made by easily counting the "Y" response column and "N" response column in the manual worksheet table prepared earlier. This is a one-way frequency table and they are readily inferred from the totals of each column in the worksheet. Sometimes, the researcher has to cross tabulate two variables for instance the age group of vehicle owners. This requires a two-way classification and cannot be inferred straight from the worksheet. For this purpose, tally sheets are used. This process of tabulation is simple and does not require any technical knowledge or skill. If one wants to prepare a table showing the distribution of respondents by age, a tally sheet showing the age groups horizontally is prepared. Tally marks are then made for the respective group i.e., 'vehicle owners', from each line of response in the worksheet. After every four tally, the fifth tally is cut across the previous four tallies. This represents a group of five items. This arrangement facilitates easy counting of each one of the class groups. Illustration of this tally sheet is presented below:

Age Groups	*Tally Marks*	*No. of Responses*
Below 20	| |	2
20-39	| | | |, | | | |, | | | |, | | | |, | | |	23
40-59	| | | |, | | | |, | | | |,	15
Above 59	| | | |, | | | |,	10
Total		50

Although manual tabulation is simple and easy to construct, it can be tedious, slow and error-prone as responses increase.

Computerized tabulation is easy with the help of software packages. The input requirement will be the column and row variables. The software package then computes the number of records in each cell of the row/column categories. The most popular package is the Statistical Package for Social Sciences (SPSS). It is an integrated set of programs suitable for analysis of social science data. This package contains programs for a wide range of operations and analysis such as handling missing data, recoding, variable information, simple descriptive analysis, cross tabulation, multivariate analysis and non-parametric analysis.

TABULATION AND CONSTRUCTION OF FREQUENCY TABLE

Frequency tables provide a "shorthand" summary of data. The importance of presenting statistical data in tabular form needs no emphasis. Tables facilitate comprehending masses of data at a glance; they conserve space and reduce explanations and descriptions to a minimum. They give a visual picture of relationships between variables and categories. They facilitate summation of items and the detection of errors and omissions and they provide a basis for computations.

It is important to make a distinction between the general-purpose tables and specific tables. The general-purpose tables are primary or reference tables designed to include large amounts of source data in convenient and accessible form. The special purpose tables are analytical or derivate ones that demonstrate significant relationships in the data or the results of statistical analysis. Tables in reports of government on population, vital statistics, agriculture, industries etc., are of general-purpose type. They represent extensive repositories of statistical information. Special purpose tables are found in monographs, research reports and articles and are used as instruments of analysis. In research, we are primarily concerned with special purpose tables.

Components of a table: The major components of a table are:

A. Heading

(i) Table Number

(ii) Title of the Table

(iii) Designation of units

B. Body

(i) Stub-head: Heading of all rows or blocks of stub items

(ii) Body head: Headings of all columns or main captions and their sub-captions

(iii) Field/body: The cells in rows and columns

C. Notations

(i) Footnotes, wherever applicable

(ii) Source, wherever applicable

The format of a Frequency Table is Presented below:

TABLE NUMBER

TITLE OF THE TABLE

Designation in units

Stub-head	Caption or Column head			Box head
	Y	N	Total	
1 ... 2 ... 3 ... 4 ...	Sub captions			Field/body (Data only)
Notations: Footnotes: Source:				

Principles of Table Construction

There are certain generally accepted principles of rules relating to construction of tables. They are:

(a) Every table should have a title. The title should represent a succinct description of the contents of the table. It should be clear and concise. It should be placed above the body of the table.

(b) A number to facilitate easy reference should identify every table. The number can be centred above the title. The table numbers should run in a consecutive serial order. Alternatively tables in Chapter 1 be numbered as 1.1, 1.2, 1., ..., in Chapter 2 as 2.1, 2.2, 2.3.... and so on.

(c) The captions (or column headings) should be clear and brief.

(d) The units of measurement under each heading must always be indicated.

(e) Any explanatory footnotes concerning the table itself are placed directly beneath the table and in order to obviate any possible confusion with the textual footnotes such reference symbols as the asterisk (*) dagger (+) and the like may be used.

(f) If the data in a series of tables have been obtained from different sources, it is ordinarily advisable to indicate the specific sources in a place just below the table.

(g) Usually lines separate columns from one another. Lines are always drawn at the top and bottom of the table and below the captions.

(h) The columns may be numbered to facilitate reference

(i) All column figures should be properly aligned. Decimal points and 'plus' or 'minus' signs should be in perfect alignment.

(j) Columns and rows that are to be compared with one another should be brought close together.

(k) Totals of rows should be placed at the extreme right column and totals of columns at the bottom.

(l) In order to emphasize the relative significance of certain categories, different kinds of type, spacing and identifications can be used.

(m) The arrangement of the categories in a table may be chronological, geographical, alphabetical or according to magnitude. Numerical categories are usually arranged in descending order of magnitude.

(n) Miscellaneous and exceptional items are generally placed in the last row of the table.

(o) Usually the larger number of items is listed vertically. This means that a table's length is more than its width.

(p) Abbreviations should be avoided whenever possible and ditto marks should not be used in a table.

(q) The table should be made as logical, clear, accurate and simple as possible.

Text references should identify tables by number, rather than by such expressions as "the table above" or "the following table". Tables should not exceed the page size by photo stating. Tables that are too wide for the page may be turned sidewise, with the top facing the left margin or binding of the script. Where should tables be placed in a research report or thesis? Some writers place both special purpose and general-purpose tables in an appendix and refer to them in the text by numbers. This practice has the disadvantage of inconveniencing the reader who wants to study the tabulated data as the text is read. A more appropriate procedure is to place special purpose tables in the text and primary tables, if needed at all, in an appendix.

Frequency Distribution and Class Intervals

Variables that are classified according to magnitude or size are often arranged in the form of a frequency table. In constructing this table it is necessary to determine the number of class intervals to be used and the size of the class intervals.

A distinction is usually made between continuous and discrete variables. A continuous variable has an unlimited number of possible values between the lowest and highest with no gaps or breaks. Examples of continuous variables are age, weight, temperature etc. A Discrete variable can have a series of specified values with no possibility of values between these points. Each value of a discrete variable is distinct and separate. Examples of discrete variables are gender of persons (male/female), occupation (salaried, business, profession), Car Size (800cc 1000cc 1200cc).

In practice, all variables are treated as discrete units, the continuous variables being stated in some discrete unit size according to the needs of a particular situation. For example, length is described in discrete units of millimeters or a tenth of an inch.

Class intervals: Ordinarily, the number of class intervals may not be less than 5 nor more than 15, depending on the nature of the data and the number of cases being studied. After noting the highest and lowest values and the features of the data, the number of intervals can be easily determined.

For many types of data, it is desirable to have class intervals of uniform size. The intervals should neither be too small nor too large. Whenever possible, the intervals should represent common and convenient numerical divisions such as 5 or 10, rather than odd division such as 3 or 7.

Class intervals must be clearly designated in a frequency table in such a way as to obviate any possibility of misinterpretation or confusion. For example, to present the age group of a population, the use of intervals of 1-20, 20-50, and 50 and above would be confusing. This may be presented as 1-20, 21-50, and above 50.

Every class interval has a midpoint. For example, the midpoint of an interval 1-20 is 10.5 and the midpoint of class interval 1-25 would be 13. Once class intervals are determined, it is routine work to count the number of cases that fall in each interval.

One-way tables: One-way frequency tables present the distribution of cases on only a single dimension or variable. For example, the distribution of respondents of gender, by religion, socio-economic status and the like are shown in one-way tables. Table 10.1 illustrates one-way tables. One-way tables are rarely used, since the result of frequency distributions can be described in simple sentences. For instance, the gender distribution of a sample study may be described as: "The sample data is represented 58% by males and 42% of the sample are females."

TABLE

Distribution of Respondents by Gender

Gender	*Number of Respondents*	*Percent to Total*
Male	116	58%
Female	84	42%
Total	200	100%

Two-way tables: Distributions in terms of two or more variables and the relationship between two variables are shown in two-way tables. The categories of one variable are presented one below another, on the left margin of the table and those of another variable at the upper part of the table, one by the side of another. The cells represent particular combinations of both variables. To compare the distribution of cases, raw numbers are converted into percentages based on the number of cases in each category. Table 10.2 and Table 10.3 illustrate two-way tables.

TABLE

Member's Democratic Participation

Category Members	*Extent of Participation*						
	Low No. of respondents	*%*	*Medium No. of respondents*	*%*	*High No. of respondents*	*%*	*Total*
Ordinary	65	41.9	83	56.8	2	1.3	155
Committee	4	10.3	33	84.6	2	5.1	39

(*Source:* Krishnaswami O.R., Cooperative Democracy in Action, Mumbai: Somaiya Publications, 1976, p. 82).

Another method of constructing a two-way table is to state the percent of representation as a within brackets item rather than as a separate column. Here, special care has to be taken as to how the percentages are calculated, either on a horizontal representation of data or as a vertical representation of data. Sometimes, the table heading itself provides a meaning as to the method of representation in the two-way table.

TABLE

Economic Status of Members and their Democratic Participation

Economic Status	*Democratic Participation*			
	Low	*Medium*	*High*	*Total*
Low	6(35.3)	11(64.7)	0(0.0)	17
Medium	13(38.2)	18(53.0)	3(8.8)	34
High	6(62.5)	10(62.5)	0(0.0)	16
Very High	2(33.3)	3(50.0)	1(16.7)	6
Total	27	42	4	73

(*Note:* Figures in brackets represent percentages to the respective totals horizontally).
(*Source:* Krishnaswami O.R., Cooperative Democracy in Action, Mumbai: Somaiya Publications, 1976, p. 131).

GRAPHS/CHARTS/DIAGRAMS

In presenting the data of frequency distributions and statistical computations, it is often desirable to use appropriate forms of graphic presentation. In addition to tabular forms, graphic presentation involves use of graphics, charts and other pictorial devices such as diagrams. These forms and devices reduce large masses of statistical data to a form that can be quickly understood at a glance. The meaning of figures in tabular form may be difficult for the mind to grasp or retain. "Properly constructed graphs and charts relieve the mind of burdensome details by portraying facts concisely, logically and simply."[9] They, by emphasizing new and significant relationships, are also useful in discovering new facts and in developing hypotheses.

The device of graphic presentation is particularly useful when the prospective readers are non-technical people or general public. It is useful to even technical people for dramatizing certain points about data for important points can be more effectively captured in pictures than in tables. However, graphic forms are not substitutes for tables, but are additional tools for the researcher to emphasize the research findings.

Graphic presentation must be planned with utmost care and diligence. Graphic forms used should be simple, clear and accurate and also be appropriate to the data. In planning this work, the following questions must be considered.

What is the purpose of the diagram?

What facts are to be emphasized?

What is the educational level of the audience?

How much time is available for the preparation of the diagram?

What kind of chart will portray the data most clearly and accurately?

Types and General Rules

The most commonly used graphic forms may be grouped into the following categories:

(a) Line Graphs or Charts

(b) Bar Charts

(c) Segmental Presentations

(d) Scatter Plots

(e) Bubble Charts

(f) Stock Plots

(g) Pictographs

(h) Chesnokov Faces

The general rules to be followed in graphic representations are:

(a) The chart should have a title placed directly above the chart.

(b) The title should be clear, concise and simple and should describe the nature of the data presented.

(c) Numerical data upon which the chart is based should be presented in an accompanying table.

(d) The horizontal line measures time or independent variable and the vertical line the measured variable.

(e) Measurements proceed from left to right on the horizontal line and from bottom to top on the vertical.

(f) Each curve or bar on the chart should be labelled.

(g) If there are more than one curve or bar, they should be clearly differentiated from one another by distinct patterns or colours.

(h) The zero point should always be represented and the scale intervals should be equal.

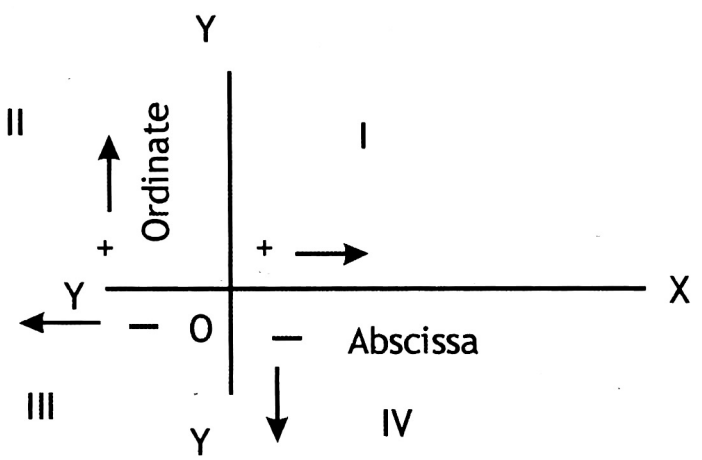
(i) Graphic forms should be used sparingly. Too many forms detract from rather than illuminate the presentation.

(j) Graphic forms should follow not precede the related textual discussion.

Line Graphs

The line graph is useful for showing changes in data relationships over a period of time. In this graph, figures are plotted in relation to two intersecting lines or axes. The horizontal line is called the abscissa or X-axis and the vertical, the ordinal or Y-axis. The point at which the two axes intersect is zero for both X and Y-axis. The 'O' is the origin of coordinates. The two lines divide the region of the plane into four sections known as quadrants that are numbered anti clockwise. Measurements to the right and above 'O' are positive (plus) and measurements to the left and below 'O are negative (minus). Exhibit 10.1 is an illustration of the features of a rectangular coordinate type of graph. Any point in the plane of the two axes is plotted in terms of the two axes reading from the origin 'O'. Scale intervals in both the axes should be equal. If a part of the scale is omitted, a set of parallel jagged lines should be used to indicate the break in the scale. The time dimension or independent variable is represented by the X-axis and the other variable by Y-axis.

Line Graph Dimensions

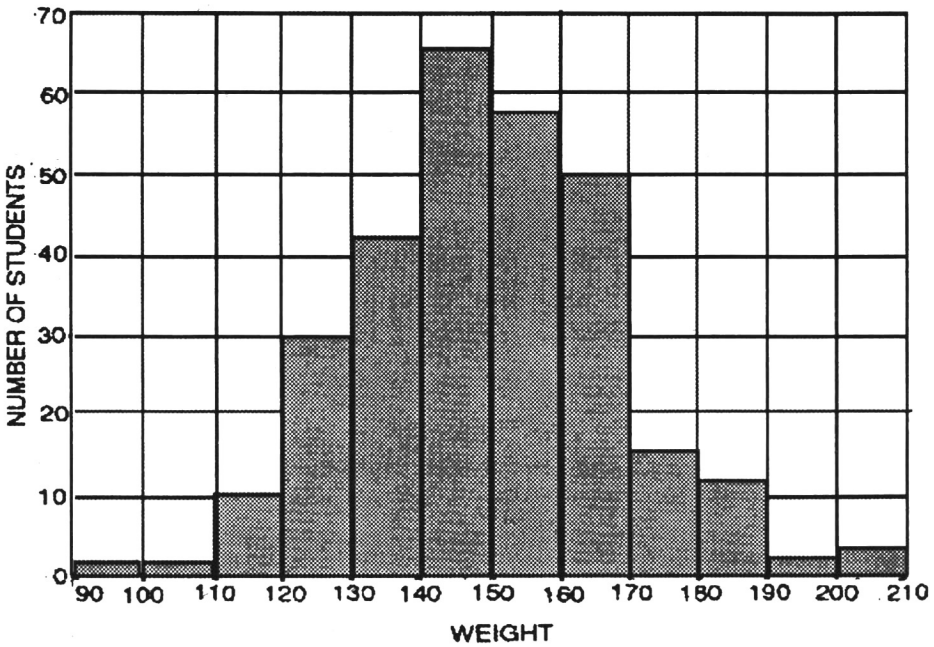


A sample line chart is provided in Exhibit 10.2. Each variable can be given a separate colour coding or style differentiation. A think, thick, or broken lines could distinguish the variables in terms of their line style.

The line graph can also provide markers for each data point. The marker for each variable can be different to distinguish it from other variables. Exhibit 10.3 gives an illustration of a line graph with markers to distinguish between the variables. The markers also highlight the value at any specific

point. It distinctly points out the values that have been joined together to form the line graph. The horizontal lines drawn across the body of the line graph is called the grid lines. The grid lines help in identifying the scale differences across the graph at a glance.

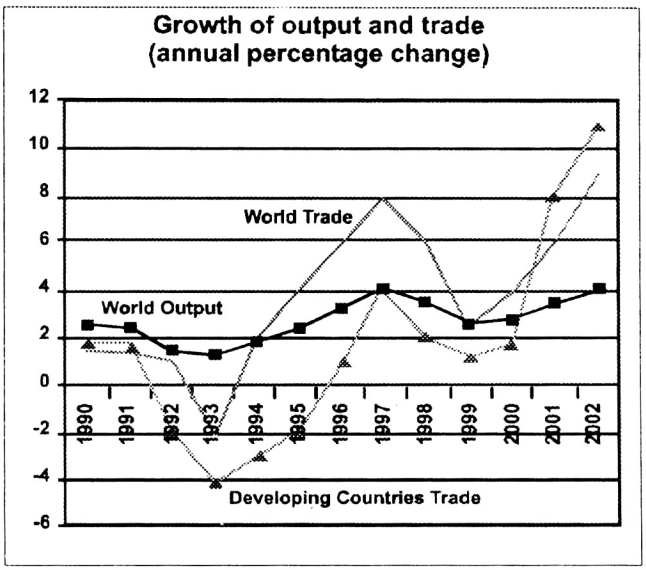
Histogram



Histogram

This is another form of line chart used for presenting a frequency distribution. It is constructed by erecting vertical lines on the limits of the class intervals marked on the base line. The vertical lines so drawn form a series of contiguous rectangles or columns. The width of each rectangle represents its class interval and the height represents the class frequency. Exhibit 10.4 illustrates the histogram.

Frequency Polygon



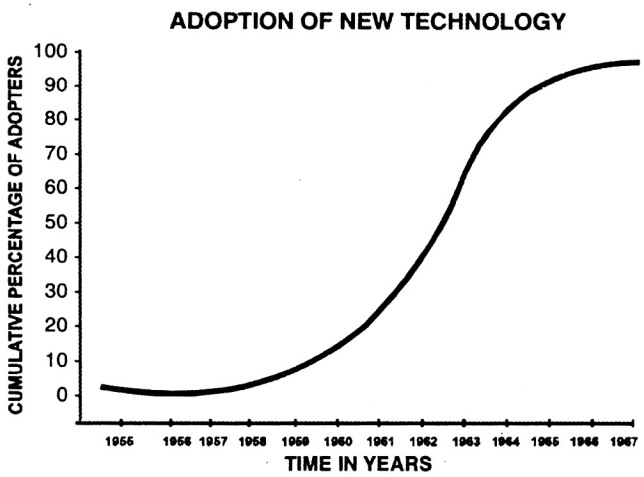
Frequency Polygon

It is often more convenient to draw a frequency polygon instead of drawing a histogram of a distribution. In laying out a frequency polygon, the frequency of each class is located at the midpoint of the interval and straight lines then connect the plotted points. If two or more series are shown on the same graph, the curves can be made with different kinds of ruling. If the total number of cases in the two series is of different size, the frequencies are often reduced to percentages. The frequency polygon is particularly appropriate for portraying continuous series. Exhibit 10.5 illustrates a frequency polygon.

It is sometimes desirable to portray the data by a smoothed curve. The chart is then called a frequency curve. Frequency polygon gives an instant picture of a frequency distribution and shows whether the distribution is normal or otherwise. For example, if the peak of the frequencies occurs in the middle, the distribution is relatively a normal one. If the peak occurs towards one end or the other, then the distribution is skewed.

Ogive

The ogive is a line chart plotted on arithmetic graph paper from a cumulative frequency distribution that may be cumulated downward or upward.

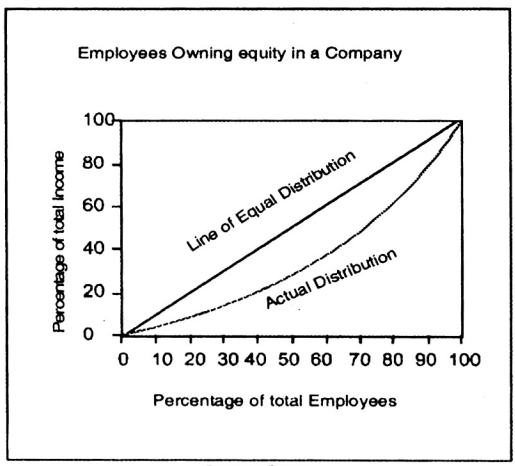


Ogive

It is useful in representing population, per capita income, per capital earnings etc. Converting the data of the distributions to percentages of the total then cumulating the percentages and plotting the ogives on the same grid may give a useful comparison of two or more distributions. The differences in steepness and share of the ogives facilitate comparative observations. Exhibit 10.6 illustrates the ogive.

Lorenz Curve

The Lorenz curve is a line chart used to compare the proportionality in two quantitative variables. It is commonly used to show the degree by which the distribution of income per family departs from the distribution of the number of families; it shows that a disparate proportion of the income goes to a few families.



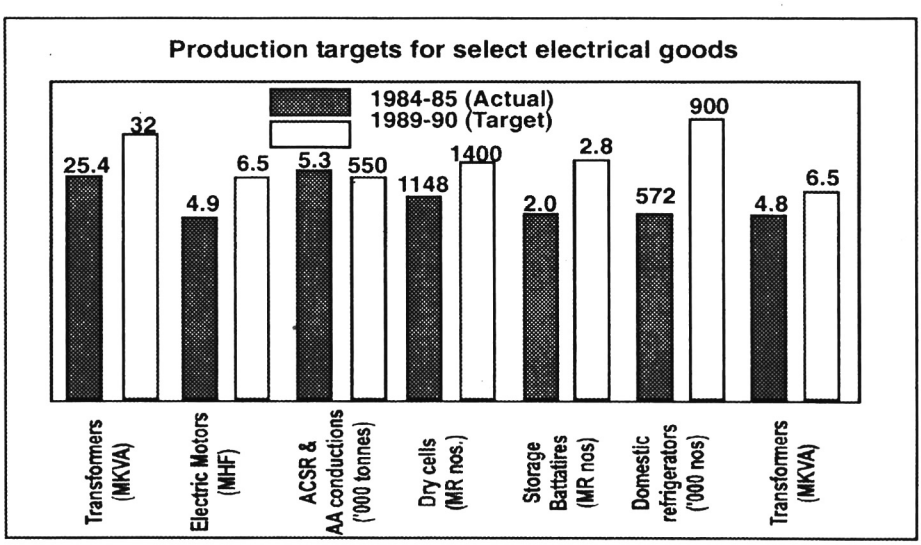
Lorenz Curve

The curve is plotted from cumulative percentages of the total of each of the variables. Exhibit 10.7 is an illustration of the Lorenz curve. The independent variable viz., the cumulative percentages of total number of employees is marked along the base line, and the cumulative percentages of total income (i.e., dependent variable) are plotted on the vertical line. The "line of equal distribution" is a line that would have been obtained if the two distributions had been proportional. The line designated 'actual distribution' reveals that the distribution of income is unequal compared to the distribution of the number of employees. The more the 'actual distribution' line departs from the 'line of equal distribution', the more unequal is the Y-variable in terms of the X-variable and the more disproportionate is the relationship.

Bar Charts

These charts consist of either vertical or horizontal bars to represent variables. The length of the bars varies corresponding to the values of the variable. Bar charts are the most effective pictorial device for comparing data. The bars may be depicted in solid blocks or in patterns of dots, dashes etc. They may be of different forms: (1) linear or one-dimensional, (2) a real or two-dimensional, and (3) cubic or three dimensional. The actual numerical values may be shown on the X-axis or Y-axis, as the case may be, or at the immediate ends of the bars.

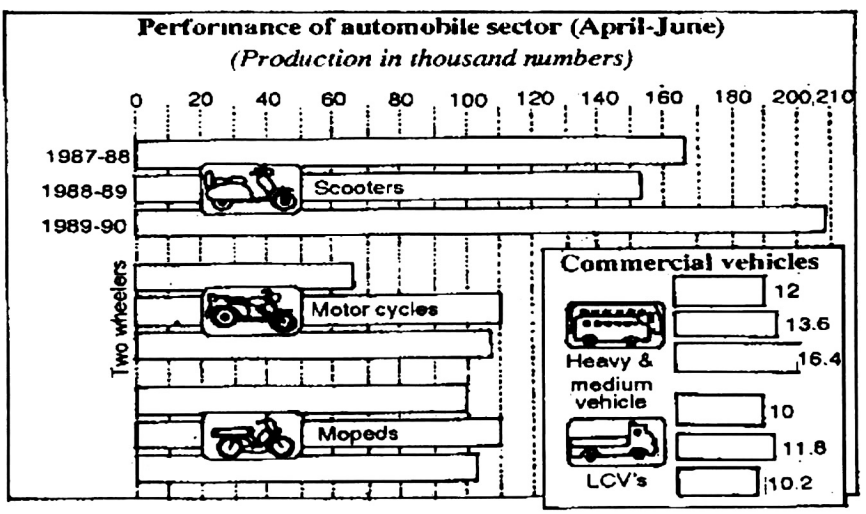
Vertical Bar Charts consists of vertical bars or columns erected on the horizontal line and the values of the bars are shown on the Y-axis a typical vertical bar chart ie shown below.



Vertical Bar Chart

The vertical bar charts are commonly used for presenting time series data.

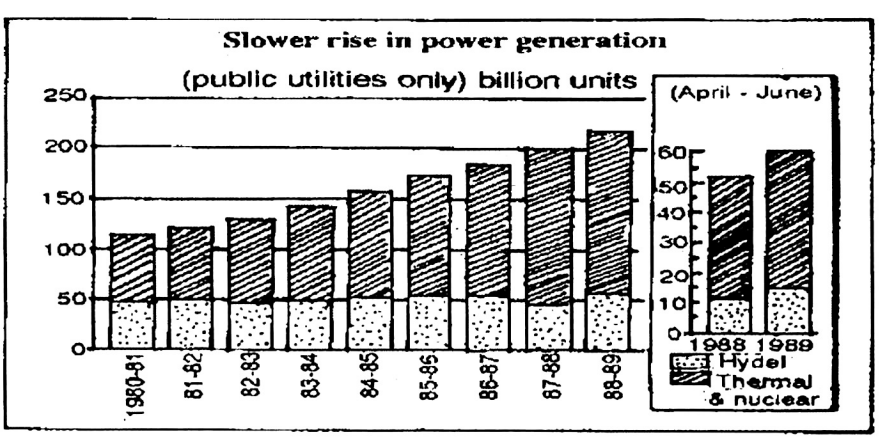
Horizontal Bar Charts are commonly used for presenting qualitative and geographical distributions. They are also used for discrete quantitative distributions. Exhibit 10.9 is an illustration of horizontal bar chart.



Horizontal Bar Chart

Component Bar Chart

This is employed to show comparisons involving two or more variables on a single chart (see Exhibit 10.10). This may consist of either horizontal bars or vertical bars. This type of chart shows not only variations in total values, but also components of the respective totals.



Component Parts Bar Chart

Principles of Designing Bar Charts

In constructing bar charts the following principles should be adopted:

1. The bars should be arranged in some systematic order: in chronological order in a presentation of time series; according to magnitude, starting with the largest, in other cases.
2. The bars should be of uniform width and properly adapted to the over-all size, proportion, and other features of the chart.
3. A scale should be included in every bar chart. The number of intervals on the scale should be adequate for measuring distances but not too numerous to cause confusion. The intervals should be indicated in round numbers.
4. The status or designations for the various categories of a bar chart should be clearly indicated to the left of the vertical base line.

Pie or Circle Charts

The circle or pie chart is a component parts bar chart. The component parts form the segments of the circle. The circle chart is usually a percentage chart. The data are converted to percentage of the total; and the proportional segments, therefore, give a clear picture of the relationship among the component parts.

The name of each segment and its percentage are placed inside its own area. When a segment is too small, an arrow is drawn to it and the legend is placed outside, in a horizontal position. The pie chart is commonly used for presenting the sectoral distribution of national income, the cost structure of a firm, or any other type of simple percentage distribution.

Pictograms

A pictogram is a variation of the bar chart. In it the values are represented by identical symbol or pictures. Each one represents a fixed size of the variable. The symbols used may be appropriate to the type of data. For example, pictures of human beings can be used for depicting population data. The pictogram is used for qualitative distributions and for time series distributions as well.

The following rules should be observed in developing a pictorial chart:

1. The symbols should be self-explanatory.

2. Each symbol should represent a convenient sum of units.
3. The chart should be made as simple and clear as possible.
4. The chart should give only an over-all picture; it should not show minute details.
5. Comparison in terms of one dimension only should be charted.

Conclusion

Whatever the graphic devices we use to represent our data, we must draw them accurately; otherwise, we may allow the readers to infer unintended meanings.

For comparing two or more items, the bar chart is ideal. The chart should be designed so that only linear comparisons are made. With linear comparison, the eye is not deceived with two or three dimensions, accurate comparisons are more difficult.

QUESTIONS

Section A

1. *What is meant by 'primary data'?*
2. *What is 'Secondary data'?*
3. *Mention any two merits of primary data.*
4. *Mention any two merits of secondary data.*
5. *What is meant by Experimentation?*
6. *Mention any two merits of Observation method of data collection.*
7. *Define the term ' Validity'.*
8. *Define the term 'Simulation'*
9. *What is meant by Interviewing?*
10. *What is meant by Focussed Interview?*
11. *What is meant by Questionnaire?*

Section B

1. *Explain the different factors to be considered in the process of Choice of Methods of data collection?*
2. *Analyse the parameter used in evaluating the methods of data collection.*

3. *Analyse the characteristic features of observation method.*
4. *Analyse the process of conducting Interviews.*
5. *Analyse the merits and demerits of Telephonic Interviews.*
6. *State the meaning of Secondary data? State it's Advantages and Disadvantages.*
7. *What are the precautions that Researcher should take if he makes use of secondary data for Research?*
8. *State the factors that are to be kept in mind while deciding data evaluation?*
9. *Observation is not suitable for all purposes? Explain?*
10. *State conditions to make interview effective?*
11. *What is telephonic Interview? What are its advantages & Disadvantages.*
12. *What are Group Interviews? State its uses? Explain merits & demerits of G.D.s*
13. *What type of questions should be avoided in questionnaire.*

Section C

1. *Define the term ' Survey'? Explain the merits and demerits of survey.*
2. *Under what circumstances are personal interviews are desired. Illustrate with an example.*
3. *Explain process of construction of questionnarie?*
4. *What are the characteristics of Good questionnaire.*

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CHAPTER - 6

ANALYSIS AND INTERPRETATION OF DATA

Analysis & Interpretation of data & Research Reporting- Meaning of Interpretation Technique of Interpretation - Significance of Reporting Writing- Steps - Layout of the Research Report- Types of Reports and presentation while Writing Research Reports.

STATISTICAL ANALYSIS & INTERPRETATION

The analysis of data is the most skilled task in the research process. It calls for the researcher's own judgement and skill. Analysis means a *critical examination* of the assembled and grouped data for studying the *characteristics* of the object under study and for determining the patterns of *relationships* among the variables relating to it. Both quantitative and non-quantitative methods are used. However, social research most often requires quantitative analysis involving the application of various statistical techniques.

Purpose of Statistical Analysis

Statistical analysis of data serves several major purposes. First, it *summarizes* large mass of data into understandable and meaningful form. This is the role of *descriptive statistics*. The reduction of data facilitates further analysis.

Second, statistics makes *exact descriptions* possible. For example, when we say that the educational level of people in a district is very high, the description is not specific; but when statistical measures like the percentages

of literate among males and females, the percentages of degree holders among males and females are available, the description becomes exact.

Third, statistical analysis facilitates *identification* of the *causal factors* underlying complex phenomena. What are the factors that determine a variable like labour productivity or academic performance of students? What are the relative contributions of the causative factors? Answers to such questions can be obtained from statistical *multivariate* analysis.

Fourth, statistical analysis aids the *drawing* of reliable *inferences* from observational data. Data are collected and analyzed in order to *predict* or make *inferences* about situations that have not been measured in full. What would be the growth rate of industrial production during the coming year? What would be the probable demand for a particular product in the coming year? Questions of this kind require predictions of future states to be made on the basis of current knowledge. Such predictions are essential in any strategic decision relating to management of an enterprise or the national economy or a social action program. The statistical prediction is one of the functions of *inferential statistics.*

Fifth, statistical analysis also helps making *estimations* or *generalizations* from the results of sample surveys. This is another function of *inferential statistics.* Sample statistics based on probability samples may give good estimates of particular population parameters. Any estimate will deviate from the true value due to sampling error. The process of statistical inference enables us to evaluate the accuracy of the estimates.

Last (inferential) statistical analysis is useful for assessing the significance of *specific sample results* under assumed population conditions. This type of analysis is called *hypothesis testing.*

Types of Statistical Analysis

Statistical analysis is used for estimating the values of unknown characteristics (parameters) of the population and for testing hypothesis for drawing inferences. Analysis may therefore be broadly classified into (1) descriptive analysis and (2) inferential analysis.

(1) Descriptive Analysis

This type of analysis describes the nature of an object or phenomenon under study. This analysis provides us with profiles of organisations, work groups, persons and other subjects on any of a multitude of characteristics such as size, compositions, efficiency, preferences etc.

This sort of analysis may describe data on one variable, two variables or more than two variables. Accordingly it is called *univariate analysis, bivariate analysis* and *multivariate analysis* respectively.

Multivariate analysis consists of (*a*) multiple regression analysis, (*b*) multiple discriminant analysis, (*c*) cannonical analysis, (*d*) multivariate analysis of variance and (*e*) factor analysis.

(*a*) **Multiple Regression Analysis** is made when one dependent variable is presumed to be a function of two or more independent variables.

(*b*) **Multiple Discriminant Analysis** is appropriate when the dependent variable cannot be measured but can be identified with a particular group on the basis of several predictor variables.

(*c*) **Cannonical Analysis** is used for simultaneously predicting a set of dependent variables from their joint covariance with a set of independent variables.

(*d*) **In Multivariate Analysis of Variance,** the ratio of 'among group variance' to 'within group variance' is worked on a set of variables. This is useful for testing hypothesis concerning multivariate differences among group responses to experimental manipulations.

(*e*) **Factor Analysis** is useful for grouping a large number of variables into a few independent factor dimensions.

(2) Inferential Analysis

Inferential analysis is concerned with drawing inferences and conclusions from the findings of a research study. There are *two areas* of statistical inference, *viz.*, (*a*) statistical estimation and (*b*) the testing of hypothesis.

(*a*) **Statistical estimation** involves estimation of the population parameters from the results of sample data analysis. In order to arrive at accurate estimates of parameters, the researcher has to effectively deal with three problems: (*i*) the precise definition of population, (*ii*) the determination of adequate sample size, and (*iii*) the selection of a representative sample.

(*b*) **Testing Hypothesis:** Hypotheses are tested with tests of significance. This testing involves the assessment of the probability of specific sampling results under assumed population conditions. Assumptions about the population parameters are made in advance and the sample then provides the test of these assumptions. An inference is also drawn about the relationships among variables.

Inferential analysis enables us to make *decisions* and draw *conclusions* from studies which could otherwise not be feasible because of the size of the universe or of prohibitive costs of a census survey or of destructive testing procedures as in quality control.

Inferential analysis involves an estimate of the accuracy of the inference called *reliability*. The reliability is expressed in terms of probability determined from the relevant statistical distribution *i.e.*, confidence levels.

Types of Statistical Measures

The statistical measures used in statistical analysis may be categorised into:

(*a*) *Measures of central tendency* – mean, median, mode,

(*b*) *Measures of dispersion* – ranges, deviation, standard deviation,

(*c*) *Measures of association/relations* – correlation, regression, chi-square test, factor analysis, discriminant analysis, cluster analysis, cannonical analysis

(*d*) *Analysis of variance* – one-way ANOVA, two-way ANOVA, MANOVA and analysis of covariance and

(*e*) *Time series analysis* – seasonal, cyclical, trend and erratic variations.

Computerized Analysis

Computer software packages are available for applications of various statistical techniques like correlation coefficients, regression, multivariate analysis and the like. They facilitate complex analysis with great ease and tremendous speed. It is not always necessary for researchers to know computer languages or to write programs. They just have to learn how to use the appropriate programs as per the instructions contained in them.

Computers can be used for generating formal models of social systems for simulating the behaviour of persons, groups of nations and for retrieving large amounts of documentary materials such as abstracts of journal articles.

The availability of computers has shifted the emphasis in social sciences from the study of univariate and bivariate problems to the study of multivariate problems. To be efficient predictors, social science theories generally need to be stated in multivariate terms. Before computer utilities, multivariate techniques were so tedious that they were not commonly used. The computers have now made these techniques accessible and practical and the potential uses of computers for research analysis stagger the imagination.

INTRODUCTION TO RESEARCH REPORT

The final and a very important step in a research study is to write its report. The research report is a means for communicating our research experiences to others and adding them to the fund of knowledge. This chapter discusses the purpose of research reports, types of reports, planning report-writing, research report format, principles of writing, drafting and finalising the report, and evaluation of a research report.

Meaning and Purpose of a Research Report

A research report is a formal *statement* of the *research process* and its *results*. It narrates the problem studied, methods used for studying it and the findings and conclusions of the study.

The *purpose* of a research report is to *communicate* to interested persons the methodology and the results of the study in such a manner as to enable them to understand the research process and to *determine* the *validity* of the conclusions. The aim of the report is not to convince the reader of the value of the result, but to *convey* to him what was done, why it was done, arid what was its outcome. It is so written that the reader himself can reach his *own conclusions* as to the adequacy of the study and the validity of the reported results and conclusions.

Characteristics of a Report

A research report is a *narrative* but *authoritative* document on the outcome of a research effort. It presents a highly specific information for a clearly *designated audience*. It is *nonpersuasive* as a form of communication. Extra caution is shown in advocating a course of action even if the findings point to it. Presentation is subordinated to the *matter* being presented. It is a *simple*, *readable* and *accurate* form of communication.

Functions of a Research Report

A well written research report performs several functions.

1. It serves as a means for *presenting* the *problem* studied, methods and techniques used for collecting and analysing data, the findings, conclusions and recommendations in an organised manner.
2. It serves as a basic *reference material* for future use in developing research proposals in the same or related area.
3. A report serves as a *means for judging the quality* of the completed research project.

4. It is a means for *evaluating* the *researcher's ability* and *competence* to do research.
5. It *provides factual base* for formulating policies and strategies relating to the subject-matter studied.
6. It provides *systematic knowledge* on problems and issues analysed.

TYPES OF REPORTS

Research reports may be classified into (a) technical report, (b) popular report, (c) interim report, (d) summary report, (e) research abstract, and (f) research article. These types of reports vary from one another in terms of the degree of formality, physical form, scope, style and size.

(a) Technical Report/Thesis

This is a *comprehensive full* report of the research process and its outcome. It is primarily meant for *academic community,* i.e., the scientists of the researcher's discipline and other researchers. It is a *formal long* report covering *all* the *aspects* of the research process: a description of the problem studied, the objectives of the study, methods and techniques used, a detailed account of sampling, field and other research procedures, sources of data, tools of data collection, methods of data processing and analysis, detailed findings and conclusions and suggestions. There is also a technical appendix for methodological details, copies of measuring instruments and the like. It is so comprehensive and complete that the study can be *replicated* by others.

The technical report is essentially technical in nature and scope and couched in *technical language.* It follows a *specified pattern* and consists of several prefatory sections with appropriate headings and paragraphs.

(b) Popular Report

This type of report is designed for an audience of executives/ administrators and other *non-technical users.* The requirement of this audience is different. The reader is less concerned with methodological details, but more *interested* in studying quickly the major findings and conclusion. He is interested in *applying* the findings to decisions.

The organization of this report is very important. The presentation can be more *forceful* and persuasive without, of course, any distortion of fact. It should be clear, brief and straightforward. Complicated statistical techniques and tables need not be used. Instead *pictorial devices* may be extensively used.

The format of this report is different from that of a technical report. After a brief introduction to the problem and the objectives of the study, an *abstract* of the findings, conclusions and recommendations is presented. The methodological details, data analysis and their discussion are presented in the second part. More headlines, underlining, pictures and graphs may be used. Sentences and paragraphs should be short. There can be a liberal use of margins and blank space.

The style may be more *journalistic* but be precise and it should encourage *rapid reading* and quick comprehension.

(c) Interim Report

When there is a long time lag between data collection and the presentation of the results in the case of a sponsored project, the study may lose its significance and usefulness and the sponsor may also lose interest in it. One of the most effective ways to avoid such eventualities is to present an interim report.

This short report may contain either the *first results* of the analysis or the final outcome of the analysis of some aspect/s completely analysed. Whatever may be the coverage of the interim report, it fulfils certain functions. It facilitates the sponsoring agency to take action without waiting for the full report. It helps to *keep alive* the agency's interest in the study and prevent misunderstandings about the delay. In addition, it serves to spread over a longer period the time consuming process of discussion of research findings and their implications. The report also enables the researcher to find the appropriate style of reporting.

The interim report contains a narration of what has been done so far and what were its outcome. It presents a summary of the findings of that part of analysis which has been completed.

(d) Summary Report

A summary report is generally prepared for the consumption of the lay audience, *viz.*, the *general public*. The preparation of this type of report is desirable for any study whose findings are of *general interest*. It is written in non-technical, simple language with a liberal use of pictorial charts. It just contains a brief reference to the objective of the study, its major findings and their implications. It is a *short report* of two or three pages. Its size is so limited as to be suitable for publication in daily newspapers.

(e) Research Abstract

This is a *short summary* of the *technical report*. It is usually prepared by a doctoral students on the eve of submitting, his thesis. Its copies are sent by the University along with the letters of request to the examiners invited to evaluate the thesis. It contains a brief presentation of the statement of the problem, the objectives of the study, methods and techniques used and an overview of the report. A brief summary of the results of the study may also be added. This abstract is primarily meant for enabling the examiner-invitees to decide whether the study belongs to the area of their specialization and interest.

(f) Research Article

This is designed for *publication* in a *professional journal*. If a study has two or more aspects that can be discussed independently, it may be advisable to write separate articles rather than to crowd too many things into a single article.

A research article must be clearly written in concise and unambiguous language. It must be logically organised, progressing from a statement of the problem and the purpose of study, through the analysis of evidence, to the conclusions and implications.

A professional journal may have its own *special format* for reporting research. It is important to find out in advance whether the publication does have specific format requirements. For example, the research articles submitted for publication in the *Journal of Applied Psychology* should be prepared according to the Publication Manual of the American Psychological Association. The preferred format is:

1. *Introduction*: A statement of the nature of the problem and a brief review of previous studies pertinent to the development of the specific questions or hypotheses to be tested.

2. *Method:* A brief statement of what was done, where and how it was done, and a statement of the specific techniques and tools used.

3. *Results:* A presentation of the salient findings with tables or charts.

4. *Discussion:* A discussion of the findings in relation to the hypotheses or questions originally posed.

5. *Conclusion:* A presentation of the contribution of the study to theory and/or practice and the broad implications of the findings.

The article must be accompanied by an abstract of 100-150 words typed on a separate sheet of paper.

Any reference to an article or other source is to be identified at an appropriate point in the text by the last name of the author, year of publication and pagination where appropriate, all within parentheses, *e.g.*, Sherman (1980); Heller (1976, p.701). No footnote is to be used for purpose of citation.

All references are to be listed alphabetically by author in an appendix titled "Reference', *e.g.*,

Grove, A.S. (1983), *High Output Management*, New York: Random House.

Tannenbaum, A., & Schmidt, W. (1958). How to choose a leadership pattern. *Harvard Business Review*, 36, 95-101.

Similarly, the *Indian Society of Agricultural Economics*, Bombay has prescribed guidelines for submission of papers for publication in the *Indian Journal of Agricultural Economics*. The preferred format is: 1. Introduction, 2. Methodology, 3. Results and Discussion; and 4. Policy implications/conclusion, followed by references. Only cited works should be included in the reference list. The style of citations to be followed is:

A.S. Kahlon and K. Singh: *Managing Agricultural Finance: Theory and Practice*, Allied Publishers Private Limited, New Delhi, 1984.

Jairam Krishna, "Focus on Wasteland Development: Degradation and Poverty," *The Economic Times*, April 13, 1986.

C.H. Hanumantha Rao, "Current Agrarian Scene: Policy Alternatives," *Economic and Political Weekly*, Vol. XXIII, No. 13, March 26, 1988.

An abstract not exceeding 100 words should be submitted along with the paper. The length of the article is limited to 20 (double space) typed pages (8½ × 11").

Regardless of the format followed, however, the style of writing should be the same as that used for a technical report thesis.

PLANNING REPORT WRITING

Steps in Planning Report Writing

After the data analysis is over, report writing cannot be started abruptly. It requires careful *pre-planning*. This planning process involves the following considerations and steps:

As a research report is a means of communication, we have to consider some basic questions which determine the effectiveness of communication, namely, *'who'* says *"what'* to *'whom'* in *'which way'* and with *'what effect.'*

1. The Target Audience: The *first step* in planning report writing is to determine the target audience. The form and style of reporting and other aspects depend upon the type of the reader, for whom the report is intended. The identification of the target audience depends on who is the researcher and what is his intention.

The *target audiences,* may be classified into (1) the academic (or scientific) community, (2) the sponsors of research, and (3) the general public.

The *academic* or *scientific community* will be the primary target audience in the following cases: (1) when the research is undertaken as an academic exercise for a Master's degree, or M.Phil. Degree or Ph.D. degree (in this case the thesis evaluation committee members will be the immediate target audience); (2) when a research student or social scientist plans to publish his research output in the form of a research Monograph; (3) when a researcher plans to write research articles based on his research for publication in professional journals. (In the last two cases, the referees, and the fellow-scientists interested in the study will be the target audience).

The *Sponsors of Research* may consist of two categories: (1) *research promotion bodies* like Indian Council of Social Science Research, the University Grants Commission, and educational foundations which provide financial support to social scientists working in universities and colleges for undertaking research with a view to encouraging them to do research; and (2) government department, industrial and other organizations which sponsor research for their *own use* in policy making and the like.

If the research is sponsored by a research promotion organization, the reporting has to follow its prevalent norms. In general, a full-fledged technical report is expected, along with an abstract of the report. When the research is sponsored by an organisation for its own use, it has to be reported according to its requirements. It is to be written as a private documents, emphasizing the findings and recommendations rather than methodology.

The *general public* is viewed as a cross-section of the society. This lay audience may be interested in the broad findings and the implications of research studies on socio-economic problems. The reporting for this audience may be in the form of a *summary report* or an article written in non-technical journalistic language.

Can one multipurpose report aiming at *all* categories of target *audiences* be *written*? The *communication characteristics*, viz., the level of knowledge and understanding, the information needs and the kind of language to which one is accustomed, are *not the same*. They vary from one type of audience to another. The preferences and the requirements of different audiences differ widely and cannot be reconciled. Hence *it is neither possible nor desirable to attempt to write one multipurpose report*. A separate report tailored to the needs of each type of audience has to be written when there is a need for communicating to different types of audiences.

2. The Communication Characteristics of the Audience: The second step in planning report writing is to consider the selected audience's communication characteristics. What is their *level of knowledge* and *understanding*? What is the *gap in knowledge* on the subject between the readers and the writer? The greater the knowledge gap, the more difficult it is to convey the full findings meaningfully and concisely.

What is the *kind of language* – scientific or journalistic – that which the readers are accustomed? What do they need to know about the study? Or, what is likely to be of *interest* to them? How can the needed information be *presented best* – verbal, a combined tabular or pictorial presentation? These questions determine the scope, form and style of reporting. The underlying purpose of a report should be noted. The purpose of report is not communication *with oneself*, but communication with the *target audience*. Hence we must constantly keep in mind the needs and requirements of the target audience.

3. The Intended Purpose of the Report: What is the intended purpose of the report? Is it meant for *evaluation* by experts for the award of a degree or diploma? It is to be used as a *reference material* by researchers and fellow scientists? Or it is meant for implementation by a user-organization? This intended purpose also determines the type of the report and its contents and form of presentation.

4. The Type of Report: With reference to the intended use, the type of report to be prepared should be determined. When the research is undertaken to fulfil the requirements of a degree or diploma, or funded by a research promotion agency, the report is prepared as a comprehensive technical report. When it is sponsored by a user-organization, it is written as a popular or summary report.

5. The Scope of the Report: The next step is to determine the scope of the contents with reference to the type of the report and its intended

purpose. For example, a research thesis or dissertation to be submitted for award of a degree or diploma should narrate the *total research* process and experience; the state of the problem, a review of previous studies, objectives of the study, methodology, findings, conclusions and recommendations.

6. The Style of Reporting: What should be the style of reporting? Should it be simple and clear or elegant and pompous? Should it be technical or journalistic? These questions are decided with reference to the target audience.

7. The Format of the Report: The next step is to plan the format of the Report, which varies according to the type of report.

8. Outline/Table of Contents: The final step in planning report writing is to prepare a detailed outline for each of the proposed chapters of the Report. An outline lends cohesiveness and direction to report writing work. Until an outline is prepared, the researcher does not know that he has to do and how to organise the presentation.

A table of contents flows from the nature of the problem under study and the objectives of the study, the hypothesis to be tested and the variables studied.

Styles of Outlining

There are *two styles of outlining:* (1) topic outline and (2) sentence outline. In the topic outline, the topic heading and the sub-topic headings are noted and the points to be discussed under each subheading may be denoted by one or two key words.

In the *sentence outline* the essential ideas to be discussed under each subtopic are stated. This requires more thought and decisions on what to include and how to say it. It guards against later forgetting certain specific points that one wanted to make.

Exhibit Styles of Outlining

Obviously, it is more *difficult* to write a sentence outline than a topic outline, but it is *more useful* than the latter. A report "writes itself if it is based upon such an outline. Since it is much easier to change the outline than to change the rough draft of the report, it is *preferable to write a sentence outline* before drafting the report. Major omissions and commissions in the drafting stage can be avoided if writing is based on a detailed outline. Of course, an outline should not be considered as a rigid scheme to be strictly followed. It is a tentative one and is likely to undergo changes while the report writing work proceeds.

Arrangement of Materials

After the detailed outline is developed, it should be studied carefully to see whether all aspects have been fully covered and arranged in a logical sequence.

The *notes cards* have to be sorted out and grouped topicwise. The groups of cards have to-be then arranged in the order in which the respective topics have been listed in the outline. Similarly the *statistical tables* and tables of statistical computation results have to be arranged in the order in which the related variables have been ordered in the outline. With these arrangements, the planning stage of report writing ends.

RESEARCH REPORT FORMAT

In this Section, the format of a comprehensive technical report or doctoral thesis is discussed.

Report Outline

A technical report has a number of clearly defined sections. While the headings of the sections and their order may vary form one situation to another, the following is suggested as a broad sequence of contents of a research report.

Report Outline

A. *Prefactory items*

1. Title page
2. Researcher's declaration
3. The certificate of the research Supervisor
4. Preface/Acknowledgements
5. Table of contents
6. List of tables
7. List of graphs and charts
8. Abstract or Synopsis

B. *Body of the report*

1. Introduction
   (a) Theoretical background of the topic
   (b) Statement of the Problem

(c) Review of Literature

(d) The Scope of the Present study

(e) The Objectives of the study

(f) Hypotheses to be tested

(g) Definition of concepts

(h) Model, if any

2. The design of the study

(a) Methodology

— Overall typology

— Methods of data collection

(b) Sources of data

(c) Sampling plan

(d) Data Collection instruments

(e) Filed work

(f) Data Processing and analysis plan

(g) An overview of the report

(h) Limitations of the study

3. Results: Findings and Discussion

4. Summary, Conclusions and Recommendations

C. *Terminal items*

1. Bibliography

2. Appendix

(a) Copies of data collection instruments

(b) Technical details on sampling plan

(c) Complex tables

(d) Glossary of new terms used in the report

a. PREFAcTORY ITEMS

Title Page

The title page is the first page of a research report. It carries: (1) the title of the study, (2) the name of the degree for which it is submitted, (3) the name of the author, (4) the name of the institution on which the report is submitted and the date of presentation.

The title should be precise and reflect the core of the problem under study. It should be printed in capital letters and centered in the page.

EFFECTIVE ORGANIZATIONAL DEVELOPMENT THROUGH PARTICIPATION AND COMMUNICATION PROGRAMME

A Thesis submitted for the award of
Ph.D. Degree

By

K. B. AKILESH

Department of Management Studies
INDIAN INSTITUTE OF SCIENCE, BANGALORE
December 1980

Exhibit shows a sample of a title page

b. Researcher's Declaration

In the case of a research undertaken by a student in fulfillment of the requirements of a Degree, he may be required to make a declaration as shown below.

DECLARATION

I declare that the thesis entitled *"A Study of the Factors influencing the relationship between Capital Structure and cost of Capital in selected larger Cooperatives in Tamil Nadu"* is a record of independent research work carried out by me under the supervision and guidance of Prof. O.R. Krishnaswami. This has not been previously submitted for the award of any diploma, degree, associateship or other similar title.

Gandhigram,
February 9, 1989
N. Narayanasamy

Exhibit Declaration by Research Student

c. Research Supervisor's Certificate

In the case of a student's research work, his research supervisor has to certify that it was a record of independent research work done by the student. See Exhibit for an illustration.

CERTIFICATE

I certify that this thesis entitled *"A Study of the Factors influencing the Relationship between Capital in selected larger Cooperatives in Tamil Nadu"*, submitted to the Gandhigram Rural Institute, Gandhigram for award of Ph.D. Degree, is a record of independent research work carried out by Mr. N. Narayanasamy, Lecturer in Cooperation, Gandhigram Rural Institute, under my supervision and guidance. This has not been previously submitted for the award of any degree, diploma, associateship or other similar title.

Bangalore
O.R. Krishnaswami
February, 9, 1989
Research Supervisor

Exhibit Supervisor's Certificate

d. Acknowledgements

In this section, the researcher acknowledges the assistance and support received from individuals and organizations in conducting the research. It is thus intended to show his gratitude. Good taste calls for acknowledgements to be expressed simply and nicely.

In the case of a research undertaken by a nonstudent researcher, acknowledgements may be made in the preface itself, where a brief background of the study is given.

e. Table of Contents

A Table of contents gives an outline of the contents of the report. It contains a list of the chapters and their sub-titles with page numbers. It facilitates ready location of topics in the report. The chapter headings may be typed in capital letters and the subtitles in small letters. For a model, see below.

Exhibit A Sample of Table of Contents

f. List of Tables

This comes after the Table of Contents. It is presented in the following format:

Table number	The title of the table	page

All the tables may be numbered serially as 1, 2, 3, 4, ... in one continuous series, or Tables in each chapter may be given a separate serial order, as I.I, 1.2, 1.3,... for tables in chapter 1; 2.1,2.2,2.3., 2.4... for tables in chapter 2; and so on.

g. List of Graphs and Charts

If there are many graphs and charts or other exhibits they should also be listed after the list of tables, as under:

Number	Title of the graph/chart	page

h. Abstract

An abstract is a succinct *statement* of the *findings* of the project. It should be as brief as possible and run about one or two pages. It is placed at the prefactory part of the report so that a reader can get a quick overview of the report. It contains a brief and precise statement of the purpose and the scope of the study and the method used for the investigation, and a bare *summary* of the *findings* or the results of the investigation. The style of writing this abstract "places a premium on directness, conciseness and condensation."[1] There should be no overemphasis of minor points, but important conclusions should be given adequate treatment.

b. BODY OF THE REPORT

After the prefactory items, the body of the report is presented. It is the major and main part of the report. It covers the formulation of the problem studied, methodology, findings and discussion and a summary of the findings and recommendations. In a comprehensive report, the body of the report will consist of several chapters.

1. Introduction

This is the first chapter in the body of a research report. It is devoted for introducing the theoretical background of the problem, its definition and formulation. It may consist of the following sections.

(a) Theoretical Background of the Topic: The first task is to introduce the background and the nature of the problem so as to place it into a *larger context* to enable the reader to know its significance in a proper perspective. This section summarises the theory or *conceptual framework* within which the problem has been investigated. For example, the theoretical background in the thesis entitled, "A Study of Social Responsibilities of Large-scale industrial units in India.[2] discusses: The nature of the Indian economy, the objective of India's Constitution to establish an egalitarian social order, the various approaches to the concept of social responsibility – property rights approach, trusteeship approach, legitimacy approach, social responsibility approach – and their implications for industries in the Indian context. Within this conceptual framework, the problem was defined, the objectives of the study were set up, the concept of social responsibility was operationalised and the methodology of investigation was formulated.

Similarly, the theoretical background in another doctoral thesis[3] on "the relationship between capital structure and cost of capital in larger cooperative

undertakings", deals with an overview of the financial management decisions, the characteristics of cooperatives, the irrelevance of wealth-maximization goal to cooperatives and the alternative 'capital-cost-minimisation' objective of financial management in cooperatives. The problem under study was formulated within this conceptual framework.

(b) The Statement of the Problem: In this section, why and how the problem was selected are stated, the problem is clearly defined and its facets and significance are pointed out.

(c) Review of Literature: This is an important part of the introductory chapter. It is devoted for making a brief review of previous studies on the problem and significant writings on the topic under study. This review provides a summary of the *current state of knowledge* in the area of investigation. Which aspects have been investigated, what *research gaps* exist and how the present study is an attempt to fill in that gap are highlighted. Thus the underlying purpose is "to locate the present research in the existing body of research on the subject and to point out what it contributes to the subject."[4]

(d) The Scope of the Present Study: The dimensions of the study in terms of the geographical area covered, the designation of the population being studied and the level of generality of the study are specified.

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

(f) Hypotheses: The specific hypotheses to be tested are stated. The sources of their formulation may be indicated.

(g) Definition of Concepts: The reader of a report is not equipped to understand the study unless he can know what concepts are used and how they are used. Therefore, the operational definitions of the key concepts and variable's of the study are presented, giving justifications for the definitions adopted. How those concepts were defined by earlier writers and how the definitions of the researcher were an improvement over earlier definitions may be explained.

(h) Models: The models, if any, developed for depicting the relationships between variables under study are presented with a review of their theoretical or conceptual basis. The underlying assumptions are also stated.

2. The Design of the Study

This part of the report is devoted for the presentation of all the aspects of the methodology and their implementation, *viz.*, overall typology, methods of data collection, sample design, data collection instruments, methods of data processing and plan of analysis. Much of this material is taken from the

research proposal plan. The revisions, if any, made in the initial design and the reasons therefor should be clearly stated.

If *pilot study* was conducted before designing the main study, the details of the pilot study and its outcome are reported. How the outcome of the pilot study was utilised for designing the final study is also pointed out.

The details of the study's design should be so meticulously stated as to fully satisfy the criterion of replicability. That is, it should be possible for another researcher to reproduce the study and test its conclusions.

Technical details may be given in the Appendix. Failure to furnish them could cast doubts on the design.

(a) Methodology: In this section, the overall typology of research (*i.e.*, experimental, survey, case study or action research) used, and the data collection methods (*i.e.*, observation, interviewing or mailing) employed are described.

The sources of data, the sampling plan and other aspects of the design may be presented under separate subheadings as described below.

(b) Sources of Date: The sources from which the secondary and or primary data were gathered are stated. In the case of primary data, the *universe* of the study and the unit of study are clearly defined. The limitations of the secondary data should be indicated.

(c) Sampling Plan: The size of the universe from which the sample was drawn, the sampling methods adopted and the sample size and the process of sampling are described in this section. What were originally planned and what were actually achieved and the estimate of *sampling error* are to be given. These details are crucial for determining the limitations of generalisability of the findings.

(d) Data-collection Instruments: The types of instruments used for data collection and their contents, scales and other devices used for measuring variables, and the procedure of establishing their validity and reliability are described in this section.

How the tools were *pre-tested* and finalised are also reported.

(e) Field Work: When and how the field work was conducted, and what problems and difficulties were faced during the field work are described under this sub-heading. The description of field experiences will provide valuable lessons for future researches in organising and conducting their field work.

(f) Data Processing and Analysis Plan: The method – manual or mechanical – adopted for data processing, and an account of methods used for data analysis and testing hypotheses must be outlined and justified. If common methods like chi-square test, correlation test and analysis of variance were used, it is sufficient to say such and such methods were used. If an unusual or complex method was used, it should be described in sufficient detail with the formula to enable the reader to understand it.

(g) An Overview of the Report: The *scheme* of subsequent *chapters* is stated and the purpose of each of them is briefly described in this section in order to give an overview of the presentation of the results of the study.

(h) Limitations of the Study: No research is free from limitations and weaknesses. These arise from methodological weaknesses, sampling, imperfections, non-responses, data inadequacies, measurement deficiencies and the like. Such limitations may vitiate the conclusions and their generalisability. Therefore a careful statement of the limitations and weaknesses of the study should be made in order to enable the reader to judge the validity of the conclusions and the general worth of the study in the proper perspective. A *frank statement of limitations* is one of the hallmarks of an honest and competent researcher.

3. Results, Findings and Discussion

This is the major part of the report. It should be an organised presentation of the results of investigation and not a clutter of tables and charts.

It may be divided into several chapters depending upon the number of objectives of the study, each being devoted for presenting the results pertaining to art objective. The chapters should bewell-balanced, mutually related and arranged in logical sequence.

The results should be reported as accurately and completely as possible, showing how they bear on the research questions/hypotheses.

Each chapter should be given an appropriate *heading*. For example, if one of the objectives of a study is to study the relationship between the socio-economic characteristics of consumers and their brand preferences, the chapter devoted to this objective may be given a heading of "Socio economic variables and brand Preferences."

Each aspect of the topic of a chapter may be dealt with under an appropriate *paragraph heading* in the following manner and order:

1. A brief description of theory or classification pertaining to it.
2. A citation of the relevant findings of previous significant studies.
3. A presentation of the summary table relating to the subject-matter.
4. Presentation of the findings and the inference drawn from it, stating how does the finding compare with the findings of earlier study/s and whether the hypothesis is accepted or rejected.

The entire verbal presentation should run as an *independent* stream and such expressions as "As seen from the above Table "or "As the following table shows " need not be used. The table number can be just referred to as" (See Table...)" in the appropriate place. Exhibit illustrates the above points.

Every table/chart should be a *self-contained and setf-explanatory* unit within the body of the report, and the presentation should be so clear that the reader be able to grasp the finding either by reading the text or by looking at the table/chart.

Age and Democratic Participation: The age of a member of a Cooperative as a correlate of the period of his membership is likely to influence his democratic participation. An older member with his longer period of membership is likely to be an activist. The study of Ostergaard and Halsey, on "Power in Cooperatives" (1965), confirms this proposition. Therefore this proposition is tested in this study. Age is classified into three categories: young (18 to 35 years), middle (36 to 50 years), and old (51 and above).

TABLE

AGE OF SAMPLE MEMBERS AND DEMOCRATIC PARTICIPATION

Age group	*Number of members*	*Average Democratic Participation Score*
Young	41	4.54
Middle	93	4.89
Old	60	5.18
Total	194	4.91

The average participation score of the 'middle' age group is higher than that of the 'young' age group, and that of the 'old' age group is higher than that of the 'middle' age group.

To test the significance of these differences the analysis of variance test was adopted. The test was not significant. The relationship between age and democratic participation was further analysed by Chi-square' test. The value

of XZ is 5.92202, while the table value at 5% level is 9.49. Hence there is no relation between age and democratic participation for this sample. The unexpected result may be due to the fact that interest in the affairs of cooperatives might not grow with advancement of age, but might depend on other factors like participation in business, cooperative knowledge, etc. Moreover, age is not necessarily a correlate of membership period."

Negative or *unexpected results* should also be stated *frankly* without a tortured attempt to explain them away.

Each Section or chapter should end with a *summary* and lead into the next section or chapter with a smooth transition sentence.

4. Summary, Conclusions and Recommendations

The ·presentation of analysis and results is followed by a separate final chapter. This chapter is more extensive than the abstract given in the beginning of the report.

This chapter should be a *self-contained summary* of the whole report, containing a summary of essential background information, findings and inclusions, and recommendations.

After a brief statement of the problem, the purpose of the study and the methodology used in the investigation, the findings and conclusions are presented. This summary may be more or less a reproduction of the topical sentences of the various findings and conclusions presented in the main body.

Findings are statements of factual information based upon the data analysis, *e.g.*, "The average democratic participation of members increases with an increase in the level of cooperative knowledge."

On the other hand, *conclusions* are *inferences/generalisations* drawn from the findings and relate to hypotheses. They are the answers to the research questions or the statements of acceptance or rejection of hypotheses, *e.g.*, "The coefficient of correlation between cooperative knowledge and democratic participation is significant at 1% level, which shows that cooperative knowledge is strongly and positively related to democratic participation. The hypothesis relating to this is proved. That is, *Cooperative knowledge promotes* democratic participation in cooperatives.[5]

The formulation of conclusions is the most difficult aspect of report-writing, A researcher sometimes may be tempted to overgeneralize on the basis of his limited data or previously held convictions, not tested by the

analysis. It is, therefore, essential to cultivate the qualities of skepticism and modesty.

Conclusions on Methodology: An investigation may throw out valuable lessons on the practical methodology – efficacy or otherwise of approaches and methods and tools adopted for collection of data, ordering items in data collection instruments, field work and the like. These lessons will be of immense use in planning and conducting similar studies in future. Hence a section may be devoted for presenting the methodological experiences. If such experiences are not reported, every researcher may have to learn by trial and error with no cumulative build-up of knowledge.

The Recommendations for Policy/Action: These should flow from the findings and conclusions. These are the actions suggested to the policy makers/ users of the research findings. Recommendations made by other researchers or study teams/committees, however important they may be, should not be reproduced if they are not related to the findings of the present study.

The recommendations should be specific and should not be mere vague statements like "Member education should be organised;" "State regulation should be liberalised." They should rather indicate 'what', 'how' and other aspects of the action suggested.

Suggestions for further research: In the course of conducting research, new questions may arise or new problems may be uncovered. It is appropriate to indicate them along with suggestions for appropriate methodology for studying them.

c. TERMINAL ITEMS

1. Bibliography

This is the first of the terminal items presented at the end of the research report. The bibliography lists in *alphabetical order* all published and unpublished references used by the writer in preparing the report. All books, articles and reports and other documents may be presented in one common list in the alphabetical order of their authors. Alternatively, the bibliography may be classified into three or four sections: (a) Books, (b) Articles, (c) Reports, and (d) other documents, and in each section relevant references may be arranged in alphabetical order.

The purpose of bibliography is *different from that of footnotes.* While the bibliography gives a list of materials relating to the topic under study as a ready reference to the reader, the footnotes, found at the bottom of the

respective pages or at the end of a section/chapter, specifically cite the exact sources and pages where quoted or paraphrased materials are found.

Format: Bibliography listing should be done with proper format in order to serve its purpose.

2. Appendix

The following documents are included in appendix: (a) Copies of data collection instruments like interview schedules or questionnaires used for the study, (b) technical details on sampling plan, (c) complex and long primary tables, (d) statistical computations, (e) supporting documents and any other evidence that may be important as backup details for the report.

A glossary of new terms used in the report may also be furnished under appendix.

DOCUMENTATION: FOOTNOTES AND BIBLIOGRAPHY

Documentation

The ethics of scholarship require proper acknowledgement of all source materials by the writer. This is a matter of intellectual honesty and validation of his work as well. Credit for borrowed words, ideas, symbols or other forms of expression should be given and their sources should be stated in the text or footnotes. Source cards prepared while reviewing literature provide the information required for this documentation.

There are two alternative models for documenting sources of ideas and information: (1) footnotes and (2) references – cited format.

Footnotes

Footnotes are of two kinds: content and reference. *Content notes* contains explanatory materials. *Reference notes* serve as documentation of sources or as means for cross-references (*see* below):

Purposes: Footnotes serves several purposes:

1. *To acknowledge indebtedness:*

   This acknowledgement is necessary when an exact quotation is used or when a passage of another writer is paraphrased. Common facts of general knowledge require no citation.

2. *To amplify or clarify the ideas or information presented in the text:*

   The footnotes used for this purpose are called content footnotes. They are used to clarify thoughts or concepts presented in the text

without complicating the presentation. These notes may include explanatory material, technical details, incidental comments, additional information and the like. Of course, value and significant facts, and directly relevant ideas should not be transferred to footnotes, but should be included in the text itself.

3. *To establish the validity of evidence:*

   All important statements of fact must be supported by evidence of their validity. Reference is given in footnotes to the source of such evidence.

4. *To refer the reader to further sources of information on the subject under discussion.*

5. *To give the original version of material that has been translated in the text.*

6. *To provide cross-reference to various parts of the thesis:*

   Reference to materials appearing in an appendix or in earlier or later portions of the report facilitate cross-reference or location of related ideas. These references are made in the footnotes, as well as in the text.

Placement: A footnote citation is indicated by placing an index number, *i.e.*, a superscript or numeral, at the point of reference. This may be immediately following an author's name, a title, a sentence or a paragraph. In the case of a directly quoted or a paraphrased except, the superscript must appear at the end of the quotation or paraphrase.

The superscript numeral must appear at the top of the line both in the text and in a footnote. No mark of punctuation is used after the superscript numeral, ether in the text or in a footnote.

Footnotes are single-spaced, with double spacing between two consecutive citations. Footnotes are numbered consecutively within each chapter or throughout the entire report, if they are a few in number.

Superscripts may be confusing for mathematical or scientific formulas; in their cases, symbols like asterisk (*), daggers (†), double dagger, two asterisks, etc. may be used.

Footnote contents: Footnote citations for reference should contain full information for identification, viz., author's name, the title of the publication,

place of publication, publisher's name, year and page number(s). A mere citation of the author's name and title only will not do.

Basic Format: Author's name, *title of the work,* place of publication: Publisher's name, Year, page no. (s). Note the punctuations. Page number to be preceded by "p" if single or "pp". if two or more pages. Title has to be underlined.

The first reference to a work should contain all the above details. If the immediate next reference, i.e.,

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Krishnaswami defines Management by Objective (MBO) as "a system of participative management on the basis of position-wise result-oriented, measurable and time-bound objectives integrated with the organizational objectives, and with the environment."[1]

Drucker[2] lays great stress on the concept of self-control. Control, according to him means "the ability to direct one-self and one's work"[3] on the basis of objective.

The objectives at one level are the means for the objectives at the higher level; and the end for the objectives at the lower level. This chain of *means-end-sequence continues.* It emphasizes that objectives at different levels in the hierarchy must be balanced and integrated *and be* consistent one with another.

An analysis of the environment[5] is an important step in establishing the organization's strategic and long-term goals.

Consecutive reference is also from the same work, then simply use the Latin abbreviation *'Ibid'* (meaning in the same work) and write the page numbers.

If the same work is cited after one or more citations from other publications, then write the author's name, abbreviation *'op.cit.'*, and the page numbers.

When a second but non-consecutive reference is made to the exact source (*i.e.*, the same work and page) previously cited, *'loc.cit.'* ('the place cited') is substituted for *'op. cit.'* the author's name is given to identify the work, but page numbers are not mentioned, because they are unnecessary.

Examples of footnotes for citing various types of materials, books, articles, Government publications, etc. are given below. The writer should carefully note the formats, punctuation, abbreviations and other details.

Author's name in Footnote: As per the general practice in vogue, the name starts with the *first name* in footnotes, but in a bibliography it starts with the *second* or *surname*. This variation may cause some difficulty and confusion, because the source of details for both footnotes and bibliography is the *same, viz.*, source cards. In source cards the names are noted starting with the surnames. I, therefore, suggest that the *same format (i.e., the surname format) may be adopted for both footnotes and bibliography* in order to avoid the confusion arising out of the conventional practice.

EXAMPLES OF FOOTNOTES

For Citing Books

Single Volume Works

1. Mann, R.S., *Social Change and Social Research,* New Delhi: Concept Publishing Company, 1988, p. 27.
2. *Ibid.*, pp. 80-85.
3. Dube, S.C., *India's Changing Villages,* London: Routledge and Kegan Paul Ltd., 1958, p. 76.
4. Mann, *op. cit.*, p. 138.
5. Bandyopadhyaya, Jayantanuja, *The Poverty of Nations,* Ahmedabad: Allied Publishers Private Ltd., 1988, p. 48.

   Multiple author book with more than three authors use "and others' or "et al. ' after the first name.

6. Sheridan, Martin C. and others. *The Motion Picture and the Teaching of English,* New York: Appleton-Century-Crofts, 1965, p. 37.

   For quoting again from a previous reference, say cited in 5, same page:

7. Bandyopadhyaya, *loc. cit.*

Chapter in an edited multiple-author book

8. Warwick, Donald P., "The Politics and Ethics of Field Research," in Bulmer, Martin and Donald Warwick, (eds.). *Social Research in Developing Countries,* Chickester: John Wiley & Sons, 1983, pp. 315-30.

Editor as an author

9. Warwick, Donald, P. and Osherson, S. (Eds.), *Comparative Research Methods,* Englewood Cliffs, NJ.; Prentice Hall, 1973, p. 86.

An Article in an Encyclopedia

10. Banta, Richard E., "New Harmony", *Encyclopedia Britannica,* Chicago: William Benton, 1968, 16: p. 305.

Publications of Government and Public Organizations

11. Government of India, *India 1986:* A Reference Annual, New Delhi: Publications Division, 1987, p. 127.

12. World Bank, *Rural Development,* Sector Policy Paper, Washington D.C., 1975, p. 26.

Quoting from Secondary Sources

13. Gand, William S., "Foreign Aid : What it is; how it works; why we provide it," *Department of State Bulletin,* 59, No. 1537, 1958, quoted in Todaro, Michael P., *Economic Development in the Third World,* New York: Longman, 1981, p. 40.

For Citing Journals

The footnote format for citing articles from scholarly journals is:

Author's name, title of article enclosed in quotation marks, name of the journal underlined, volume number, issue number, the date of publication, page numbers. (The place of publication and publisher's name are not given).

14. Goel Ranjan, "Achievement Through Human Engineering," *Indian Management,* 28, No. 8, July, 1988, pp. 14-16.

15. Drucker Peter F., "What Business can Learn from Nonprofits," *Harvard Business Review,* 4, July-August 1989, pp. 88-93.

Newspaper Articles

16. Kumar, Naresh, "Exploring Sea for Economic Progress," *The Economic Times* (Bangalore), August 7, 1989, p. 5.

17. Editorial, *Deccan Herald* (Bangalore), August 5, 1989, p. 8.

For Citing Thesis or Dissertation

18. Pandey, Subrata, *A Study of Organizational and Individual Characteristics in R & D Organizations,* unpublished Ph.D. Thesis, Bangalore: Indian Institute of Science, 1986.

For Citing Semimar Paper

19. Krishnaswami O.R., "Towards Excellence in Cooperative Management," (Paper presented at a Seminar on *"Excellence in Management,* Cooperative Training College, Bangalore, July 1989).

Typing Instructions for Footnotes

1. No space intervenes between the word, or the mark of punctuation, and the superscript that follows it.
2. No mark of punctuation is used after the superscript numeral, either in the text or in the footnote.
3. Footnotes may be numbered 1,2,3.... in each chapter.
4. All footnotes for citations on a page are listed at the bottom of the page, without, of course, intruding into the bottom margin.
5. At the bottom of a page, draw a *dividing line* one and one-half inches long, one double space below the last line of textual material, beginning at the left margin.
6. The first footnote is put a double space below the above line.
7. Each footnote begins with its superscript, is indented as a paragraph, and is single-spaced.
8. When two or more footnotes appear at the bottom of a page, a double space is left between them.
9. For the sake of balanced appearance of a typed page, two or more consecutively numbered short footnotes are put on one line. e.g,, [12]Roy, op. cit., p. 40.[14] Ibid.
10. A footnote to a table or chart is placed one double space below it, without a dividing line.

Reference-cited Format

The *reference-cited format* of documentation consists of a single listing of research references at the end of a paper or thesis. This is preferred in most scientific writings. It is most often headed *"Reference Cited"* or *"References."* Sources are referred to in the text by author and year publication, and page number. References are listed in alphabetical order at the end of the report/ paper without numbering. They include page numbers, if page numbers are not mentioned in the references cited in the text.

Examples of sources cited in the text and their listing under References are given below:

Citation in the text

Becker and Geer (1975) suggested that participant observation was to be preferred to interviewing....

Martin Trow (1957) argued that one method was not inherently superior over another.

Proponents of survey research are the first to admit the problems of bias and error which can occur (see Schuman, 1982).

"It is not that the numbers are necessarily false but that they draw the inquirer's attention away from what is of crucial significance", (Leach, 1967, p. 82).

"No amount of statistical sophistication can set right the distortions and falsifications introduced by wrong data" (Srinivas, Shaw and Ramaswamy, 1979, p. vii).

Gerald Berreman (1972, pp. xvii-lvii) has ably highlighted the problems of sample surveys in his essay on his field experiences in the Himalayas.

Computers are now universally used in the industrial world to handle quantitative social data, while their use in the developing world is less general. (For an excellent review of the practical and technical aspects of data processing, see Hursh-Cesar and Roy, 1976, pp. 347-98).

The listing of above references under "References"

REFERENCES

Becker, H.S. and Geer, B„ "Participant Observation and Interviewing," *Human Organization,* 16, 1957, pp. 28-32.

Berreman, G.D., *Hindus of the Himalayas: Ethnography and Change,* Berkeley, University of California Press, 1972.

Hursh-Cesar, G. and Roy, P. (Eds.), *Third World Surveys: Survey Research in Developing Nations,* Delhi: Macmillan of India, 1976.

Leach, E.R., *"An anthropologist's reflections on a social survey,"* in D.G. Jongmans and P.C.W. Gutkind (Eds.), *Anthropologists in the Field,* Assen, Netherlands: Van Gorcum, 1967, pp. 75-88.

Schuman, H„ "Artifacts are in the mind of the Beholder," *American Sociologist,* 17, 1982, pp. 21-28.

Srinivas, M.N., Shah A.M. and Ramaswamy, E.A., *The Fieldworker and the Field: Problems and Challenges in Sociological Investigation,* Delhi: Oxford University Press, 1979.

Trow, Martin, "Comment on 'Participant Observation and Interviewing' by Becker and Geer," *Human Organization,* 16, 1957, pp. 33-35.

If a cited author, say Arul had published more than one article in 1986, the citation for a particular reference would be Arul (1986 b: 25-28) indicating that this was the second entry with a publication date of 1986 for Arul.

There are *acceptable variations* in footnote *formats.* For example, in some, the place of publication is cited after the name of the publisher, in some, the place of publication and publisher's name are enclosed in brackets; in some, the year enclosed in parentheses appears immediately after the author's name and so on. What is important is *use of a particular format consistently* in a paper/thesis.

Bibliography

The Bibliography is a list of references relating to a topic or subject. It is located at the end of the main body of the report. It contains all the information found in a first footnote relating to a work.

The *function* of *bibliography* is *different* from *that* of *footnotes.* While footnotes are used to cite authority for specific statements quoted or paraphrased, the bibliography lists in alphabetical order references used by the writer. The footnotes designate the exact place (*i.e.*, page/s) where the quoted matter is located. But the bibliography just gives identification details for the works, as a whole. There may be several footnotes to a work, but there is only one entry for it in bibliography. The footnote appears only when a specific matter from a work is cited, whereas, a work may be listed in the bibliography even if it is not quoted in the report, provided it is related to the subject of the study.

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

Another difference is often indicated: While in the first footnote relating to a work, author's name begins with the first name (*e.g.,* Peter F. Drucker), in the bibliography, name begins with the second or the surname (*e.g.*, Drucker, Peter F.). As the information required for the footnotes and the bibliography

is secured from the same source, *viz.*, source cards, the author-surname format may be used in both cases, as explained earlier.

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

A bibliography containing less than *twenty* titles need not be sub-divided into categories.

When there are two or more works by the same author repetition of his name is avoided by substituting for it an unbroken line eight spaces in length, beginning with the left margin, *e.g.*, Good Carter V. ed., *Dictionary of Education,* New York: McGraw-Hill. 1973.

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

WRITING THE REPORT

Introduction

No researcher, however experienced, can write a research report in final form in one draft. The report needs several revisions and rewriting. This hard fact has to be kept in mind while starting the writing work. The writer should arrange the following materials in an order and keep them on the table ready for use:

1. The detailed outlines for chapters
2. Note cards arranged in the order of chapters
3. Source cards arranged in an alphabetical order
4. Statistical tables, charts and results of analysis, each in a separate sheet and
5. Plain sheets of paper and a good pen.

The writer should overcome the *initial inertia* – the tendency to put off beginning to overcome this tendency, the writer should set aside a section of free time for the report writing work. If this can be as long as an entire morning, so much the better. He should establish a regular schedule for writing until the work is done. He should begin drafting as soon as some thoughts on

the topic crystallizes in his mind. Once he starts writing, he should keep going, and maintain a psychological momentum. He should plan for an atmosphere of quiet and isolation. I recall what I did when I wrote my doctoral thesis. I was used to get up at 4.30 AM and concentrate on writing in my study room without any disturbance and similarly on weekends. I used to go to my room in the college and concentrate on writing. Any serious writing requires free mind, and free atmosphere.

First Draft

On what the writer should concentrate in the first draft stage? He should concentrate on substance, *i.e.*, fullness of facts, as per the planned outline. In writing the first draft, maintaining a flow of ideas is more important than choosing exact words. Hence the entire first draft work should be completed without any stopping for editing.

The points to be kept in mind in writing the first draft are:

1. Keep in mind that you are writing for communicating with the target audience.
2. Keep the purpose of each chapter, section and paragraph in mind.
3. Expand the outline and put all ideas that occur on paper.
4. Do not hesitate to write in any order those sections of your total work that seem to have grown ripe in your mind.
5. Do not struggle for words and phrases. Write down something that occurs. As Barzun and Graff have aptly said, "Paper is not granite, and in a first draft you are not carving eternal words in stone."[8] Inappropriate words can be replaced while revising the draft.
6. When any idea, word or phrase refuses to come to mind, leave it blank. It will arise easily on revision.
7. Write different sections and major ideas on *separate sheets* to facilitate additions and cuttings.
8. Write on *one side* of the sheet leaving larger margin (say 2") on the left side.
9. Leave *double space* between *lines* to provide for corrections.
10. Do not copy the tables on the text, just pin them in the appropriate places. This is necessary for avoiding recopying tables at every revision.
11. Document each borrowed idea or information – whether quoted exactly, paraphrased or summarised–by a footnote on the same page.

12. Give appropriate headings to chapters, sections and paragraphs.
13. When the first draft is completed, make sure that all research *objectives* have been analysed and discussed adequately, all research *questions* have been answered adequately, and all the *hypotheses* have been tested adequately.
14. Ensure the correctness of facts and citations.

After the first draft work is over, keep the matter in a cupboard and forget it for some days. Later take it up for reading and revision with a fresh outlook.

Revisions

The first draft should be read carefully again and again and edited thoroughly and revised. Any writing improves upon revision. In revising the first draft, the attention should be given to *form, language, readability, clarity* and *lucidity*. With an open and critical mind the researcher must correct, carve, cut, add and polish. The following *points* may be *kept in mind:*

1. Keep in mind the requirements of a research report (See the principles of report writing).
2. Fill in the blanks with appropriate ideas, words or phrases.
3. Reorganize ideas wherever necessary.
4. Eliminate gaps in continuity and unclear statements.
5. Replace inappropriate words by exact and apt words.
6. Omit needless words and expressions such as "as a matter of fact", "owing to the fact that ...." etc.
7. Simplify sentences and improve their effectiveness.
8. Cut off repetitions by giving cross references.
9. Improve the readability and clarity of the writing.
10. Correct the spelling and grammatical errors.
11. Make a *critical evaluation* of the draft as if you are evaluating another writer's draft, using the following *Test Questions:*

Evaluations of the draft report: Test Questions

Methodological aspects

(1) Has the research plan – as originally drawn up and as ultimately realised – been presented in detail? (This will enable the reader to

know the difficulties faced by the researcher and take a correct view of his findings and conclusions).

(2) Does the report fulfil the aims of the study?

(3) Does the title reflect the core of the problem studied?

(4) Have the observational and reading background which led to the hypotheses been given?

(5) Are the hypotheses and operational definitions of concepts specific and clear?

(6) Have the problem and hypotheses been stated in scientific terms?

(7) Is the chapter scheme relevant to the objectives of the study?

(8) Are the hypotheses tested appropriately and adequately?

(9) Are the findings and inferences clear and substantiated by data evidences?

(10) Are the conclusions effective, logical and based on the findings?

(11) Are the recommendations flow from the findings and conclusions?

(12) Are the recommendations specific, practical, weighty and convincing?

(13) Does the summary really summarize and point to further research?

Organization and Form

(14) Has the target audience been kept in mind?

(15) Is the division of the report into chapters and sections appropriate and logical?

(16) Is there a smooth development from the introduction to recommendations?

(17) Are there order and proportion in the paragraphs, sections and chapters?

(18) Are the quotations accurate?

(19) Is the technical information up-to-date?

(20) Have you given the techniques for the development of scales and indexes?

(21) Are the tables and charts accurate and self-contained?

(22) Are the footnotes complete and correct?

Language and Style

(23) Does the language conform to prevailing standard of usage?

(24) Is the presentation accurate, clear, crisp, logical and complete?

(25) Are the opening sentences of chapters, sections and paragraphs attractive?

(26) Is the style smooth and coherent?

(27) Is the expression strong, vigorous and dignified and free from grammatical and spelling errors?

(28) Has every word been weighed and used for its exact meaning and function?

(29) Are the findings and arguments concise?

(30) Are there no jargons and vague words?

(31) Are you sure that you have done a good job, and are you, as your own critic, satisfied with the report?

(32) Rectify the flaws, imperfections and weaknesses discovered in the course of the above critical evaluation, and improve the presentation.

(33) Get the revised draft read by your colleagues/guide, as the case may be, and invite their constructive criticism. It may be hard to take criticism, but as a researcher you must learn to take it with open mind.

(34) Give each criticism serious, careful and objective attention.

(35) Revise the draft in the light of valid criticism and suggestions made by the readers.

Final Stage

The final stage of the work consists of (a) *Adding* the following *elements* to the report:

(1) title page, (2) acknowledgement/preface, (3) table of contents, (4) list of tables and charts, (5) bibliography and (6) appendices (See *Research Report Format,* above) and (b) the final editing of the revised and completed report. In the *final editing, your* attention should be focused on the *relationship between* the original *research questions* and the report once more. Look at the introduction and the conclusion. Are those sections adequate in every way? Did you stay on the track? Are all investigative questions fully developed? Does the

entire report read smoothly, with transitions that carry the reader along from one idea to the next? Is the report *complete* in all respects? Are *all* the *elements* – the title page, table of contents, list of tables and charts, bibliography and appendices – have been *added*? Are they complete and correct? Does the report *justify* the time, energy and thought you have invested on it? If the answer to all these questions is "Yes", your report is ready for *final proofreading.*

Set aside the final draft for a few days, and then take it up for *final reading* with a fresher outlook. Do not rush through. Read word by word. All *data* should be *checked* against the original, and *computations* should be checked and cross-checked to ensure absolute accuracy. The sequence of page numbers, table numbers, footnote numbers should be checked. The footnotes and bibliographical entries should be checked carefully against the original. The correspondence of captions and numbers of tables and charts in the text and in the list of tables and charts should be checked. Your *aim* is to give *finishing touches* and correct all grammatical errors and deficiencies in punctuation, spelling, word choice, and sentence structure. Of course, there is no limit to perfection. One can go on improving the report. Your final satisfaction and fulfilment that you had done all that you should do to your report serves as an indicator to complete the work.

TYPING THE REPORT

Introduction

The final manuscript of the report should be given for typing preferably to a professional typist with experience in typing research reports. The required number of multiple copies may be produced either by the traditional method of typing an original and three or four carbon copies or by the modern method of xeroxing multiple copies from a single original typed in an electronic typewriter. The later method is preferable, because the quality of reproduction will be excellent.

The writer is expected to submit an accurate and acceptable draft to the typist. The final should be correct in all grammatical conventions: capitalization, punctuation, spelling, compound words, hyphenation, and paragraphing. The writer should give clear *instructions* on requirements of margins, word division, indentions, documentation placement, spacing, headings, tables and charts, and quotations. The typist should use a new black medium-inked ribbon, superior grade black carbon sheets and good quality bond papers.

Typing Instructions

Paper: Most universities require the thesis or dissertation typed on quality bond paper of sixteen – or twenty–pound weight and 8½ × 11 inches in size. Only one side of the sheet should be typed.

Margin: The left-side margin should not be less than 1½ inches (or 40 mm), the right, top and bottom margins one inch (or 25 mm).

Centering: The material on any page should be symmetrically arranged with reference to the centre of the typed matter. To facilitate the proper placement of copy on the page a guide sheet may be constructed, showing the proper margins, centre of the copy portion, and the number of lines from the top and bottom margins. This sheet should be ruled in black ink and placed beneath the first sheet, so that the markings show through.

Spacing: The text of the thesis should be *double-spaced* and *indented quotations* and *footnotes* should be *single-spaced.*

Words Division: When the division of word is necessary to avoid great marginal unevenness, the break should come between two syllables, for example, "thirty-six" rather than "thirty-six." Do not divide words of one syllable. Do not also divide a word at the end of a page.

Proper names: When there is occasion to use both given name and surname, or initials and surname, they should preferably be all on the same line; very long names will, of course, require an exception.

Indivisible items: Letters of a government agency, the dates, parts of an equation, monetary expressions, and hours of the day should not be divided and run over to a second line; examples are

BBC IFC	March 10,1989	6x + 4y = 27
Rs. 1,487.10	524 B.C	8.00 a.m.

Alignment of Numerals: Numericals are often arranged in vertical lists, and aligned on the right side, for example, columns of figures should appear as follows:

5
8
27
485
15,364

Headings and titles: Chapter *headings* and Section headings should be *capitalised* and *centered.* Subdivision headings should be typed from the left-

hand margin in lower-case and underlined. A section within a chapter should normally be commenced on a new page. The titles of appendices should be capitalized and centered on the page. The titles of tables and charts should also be capitalised, centered and placed above the material to which they refe .

Paragraphs should be indented seven spaces for pica type, nine for elite.

Tables, Graphs and Diagrams: They should be placed as near as possible to the text to which they refer. Short tables can be included in the body of the text. The table number should be separated from the text by two or three spaces. Two spaces below, the heading should be typed in capitals. If an explanatory note to a time is necessary, an asterisk should be used. The note should be placed immediately below the table. If the writer is quoting a table, the sourcer should be indicated below the table preceded by the word 'Source.'

Quotations: Direct quotations not over three typewritten lines in length are included in the length are enclosed in quotation marks. Quotations of more than three lines are set off from the text in a single-spaced paragraph and indented four spaces from both left and right margins without quotation marks.

Pagination: Pages of the text are numbered continuously in Arabic numerals; prefactory material in small Roman numerals.

Corrections: Strikeovers, crossovers, insertions and erasures are not permitted. Corrections by pen are never permissible. Either the error should be corrected on the typewriter, or the page should be retyped. White correction fluid may be used for carrying out the corrections.

Proofreading

The typed script should be carefully read. This proofreading should consist of a word-by-word search for misspelling, mispunctuation, and typing errors. All the errors should be corrected on the typewriter, using correction fluid. Pages with noticeable erasures should be retyped. The final typed script should be accurate, neat, clear and attractive.

Binding

The research students must consult department regulations relating to binding. Binding should be neat and attractive. The writer should make sure the pages are in the correct order before copies are sent to the binder.

QUESTIONS

Section A

1. *What is meant by content analyses?*
2. *What is meant by Tabulation?*
3. *Analyse the purpose of statistical Analysis.*
4. *Mention the characteristic features of Arithmetic mean.*
5. *Define the term Interpretation.*
6. *Define a research Report.*
7. *What is meant by terminal report?*
8. *What is bibliography?*
9. *Mention the purpose of 'footnote'.*

Section B

1. *Distinguish between Technical Report and a popular report.*
2. *Describe the Format of a research report?*
3. *On what basis research report is evaluated?*
4. *Analyse the points to be considered in writing the first draft of the research report.*
5. *Distinguish between Bibliography and footnote.*

Section C

1. *Explain the concept of content- analysis? What are the aims and uses of content analysis in social science research.*
2. *Explain the principles to be followed in organising the research report.*
3. *What is the meaning of Analysis of Data? State the purpose of satistical analysis?*
4. *What are the different methods of statistical analysis explain?*
5. *Write the brief about various measures of central technology used for data analysis.*