

Government Art's and science college kovilpatti

III BCOM (V SEMESTER)

PART III

Research methodology

SMCO54

By

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**III B. COM (V SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -16
RESEARCH METHODOLOGY**

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Objectives

1. To understand the basic concepts of research and its methodologies.
2. To organize and conduct research in a more appropriate manner.

Unit I: Introduction to Research – Types of Research – Significance of Research – Research methods vs. Methodology – Research – Research process – Criteria of Good Research. **(10 hours)**

Unit II: Research Design – Meaning of Research design – need for research design – features of a good design – different research designs. **(10 hours)**

Unit III: Design of sample surveys – sample design – sample survey Vs census survey – Types of sampling designs – Non probability sampling – probability sampling – Complex random sampling design. **(10 hours)**

Unit IV: Data Collection and preparation – Collection of Primary Data – Methods of Collecting Primary Data - Guidelines for Constructing Questionnaire / Schedule- Difference between Questionnaire and schedule - Collection of secondary data – Data Preparation process. **(15 hours)**

Unit V: Interpretation and report writing – Meaning of interpretation – techniques of interpretation – precautions in interpretation – significance of report writing – different steps in writing report – layout of the research report – mechanics of writing a research report – precautions for writing research report. **(15 hours)**
(60 hours)

Text Book

C.R. Kothari, Gau Rav Garg, “Research Methodology methods and techniques”, New International Publishers.

Reference Books

1. P. Ravilochanan, “Research Methodology”, Margham Publications.
2. P. Saravanavel, “ Research Methodology”, Kidap Publications.

CHAPTER 1

INTRODUCTION TO RESEARCH

Meaning

The word Research is derived from the French word "Researcher", which means such back. Research is an investigation which is meant for gaining of knowledge either to understand the problem or to solve the same. This is satisfaction for the thirst for knowledge.

Research in common parlance refers to a search for knowledge. Research refers to a scientific and systematic search for pertinent information on a specific topic. Research may also be considered as a movement from the known to the unknown.

The search for knowledge through objective and systematic method of finding a proper and feasible solution to a problem, is called as research.

In common parlance research connotes "search for more knowledge. But the real meaning of research goes beyond searching for knowledge.

Research is a systematic or scientific investigation.

- i) to search for solutions to the existing and future problems.
- ii) to establish relationship, if any, among variables and
- iii) to find something new to increase our knowledge.

Research refers to the art of scientific investigation. It is a systematic process of design, collection, analysis, reporting the findings and arriving at solutions for business problems.

Research is a systematic investigative process employed to increase or revise current knowledge by discovering new facts.

Research is a systematic search for an answer to a question or a solution to a problem. Research is the process of a systematic and in depth study or search of any particular subject or area of investigation, backed by the collection, compilation, presentation and interpretation of

relevant details or data.

Research is the fountain of knowledge for the sake of knowledge and an important source of providing guidelines for solving different business, governmental and social problems. Research is a sort of formal training which enables one to understand the new development in one's field in a better way.

Research refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analysing the facts and reaching certain conclusions either in the form of solutions towards the concerned problem or in certain generalisations for some theoretical formulation.

Definition

The encyclopedia of social sciences defines research as "the manipulation of generalising to extend, correct or verify knowledge"

According to **Kerlinger**, research can be defined as "any organised activity designed and carried out to provide information for solving a problem".

According to **Creswell**, "Research is a process of steps used to collect and analyse information to increase our understanding of a topic or issue".

Robert Ross, Research is essentially an investigation recording and analysis of evidence for the purpose of gaining knowledge"

Goodman "Research is a systematic effort to gain new knowledge and this movement from known to unknown.

Emory, "Any organised enquiry designed and carried out to provide information for solving problem".

D.Slesinger and M.Stephenson in the Encyclopedia of Social sciences define research as "the manipulation of things, concepts, or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art"

Characteristics of Research

Good Research generates dependable data, being derived by practices that are conducted professionally, that can be used reliably for managerial decision making. A good research has the following features.

1) Research is systematic enquiry

Research is a careful patient, systematic and diligent enquiry, hence the researcher should not have the urge of completing the research in a hurried manner. Hence, a good research should be done in the careful manner in terms of collecting, organising and evaluating data. It is directed towards the solution of a problem. Therefore, the research proceeds experiments from an investigation.

2) Clearly defined purpose

The problem should be clearly defined and sharply delineated. The statement of the decision problem should include its scope, limitations and precise specifications of areas significant to research.

3) Research is undertaken to establish facts

It is a significant activity if establishes the fact, theory, principle or an application. It does not mean mere computation of information. An enquiry should lead to conclusion. The Research must be based on the principle of "every Action has an equal and opposite Reaction".

4) Objectivity

A good research is objective in the sense that it must answer the research questions. This necessitates the formulation of a proper hypothesis, otherwise there may be back of congruence between the research Question and the hypothesis.

5) Solve a problem

Research is directed towards finding answers to pertinent Questions and solutions to problems. The problem may be a social problem or problem of business nature. It should also establish relationship between two or more among several variables.

6) Generalisation

1.4 Research Methodology

It refers to the feature where a study should have almost the same result by using an identical methodology for universal applicability. It helps to determine and predict future occurrences or happenings.

7) Universal

The results must be amenable for generalisation and applicable for universal adaptation.

8) Empirical

Empirical means factual investigation is possible. Its validity can be checked through reliable sources and evidences. Research should be such that it can be validated. That is, it should be possible to describe, interpret and explain the phenomenon.

9) Expertise knowledge

Research requires expertise knowledge that too new knowledge. Further the Research should know what is already known and how other investigate the same. That is, skill necessary to carry out investigation, search the related literature and to understand and analyse the data gathered.

10) Verifiable

A researcher can verify the results by repeating the study and thereby delivering a sound decision framework. A good research must be amenable for verification. It should yield the same type of results under similar conditions.

11) Honesty

Honesty is the back bone of research. The researcher must be honest and scrupulous in collection of data, analysis, interpretation and reporting of the results.

12) Logical study:

The study in research must be logical in nature and must have the chance of testing the hypotheses and to draw conclusions which will satisfy the people.

13) Rational:

There is no place for rule of thumb or superstitious belief in research. There should be always a cause - effect relationship. The Question of obtaining objects from thin air does not arise in a rational research. **Dalton's** time tested theory "matter can neither be created nor destroyed and can only be transferred from one form to another" should be underlying factor in rational research.

14) Gathering new data:

Research involves gathering of new data from primary data or first hand sources or using existing data for a new purpose.

Objectives or purpose of Research

The purpose of research is to find solutions to problems through the application of scientific procedures. Research objectives are listed below.

- 1) To gain familiarity with a phenomenon or to achieve new insights.
- 2) To establish generalisations and general laws and contribute to theory building in various fields of knowledge.
- 3) To analyse the characteristic of an individual, group or situation.
- 4) To determine the frequency with which something occurs and to see that whether it is associated or disassociated with other variables.
- 5) To verify and test the existing facts and theory and these help improving the researcher's knowledge and ability to handle the situations and events. **Merton** argues : "Empirical research goes for 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" - **Malinowskil**.
- 6) To analyse inter relationships between variables and to derive causal explanations and thus enables the researcher to have a better understanding of the world in which the researcher lives.
- 7) To develop new techniques concepts or theories for letter study of

unknown phenomena.

8) To promote better decision making.

9) Applied research aims at finding solutions to problems such as socio economic problems, health problems, human relations in organisations.

10) To aid planning and thus to contribute to national development.

The **purpose** of Research can be summarised **by considering** various **types of research** and their applications.

1) Purposes of Basic Research

Basic Research is also called as pure or fundamental Research. Basic research is the research which is done for knowledge enhance-ment. It is original in character and has a formal science. The research is done for human welfare, animal welfare and plant kingdom. The main motivation is to expand man's knowledge, not to create or invent some-thing. **Dr.G.Smoot** says "People can not foresee the future well enough to predict what is going to develop from the basic research" It is concerned with formulation and generalisation of theory.

2) Purpose of applied research

Applied research is designed to solve practical problem of the modern world, rather than to acquire knowledge for knowledge sake. This research is aimed at finding solutions to the immediate problem. The goal of applied research is to improve the human condition. It focuses on analysis and solving social and real life problems. According to Hunt, "applied research is an investigation for ways of using scientific knowl- edge to solve practical problems" **for example**; improve agriculture crops production, treat or cure a specific disease, improve the energy effi- ciency homes, offices, etc. According to **Poulin Young**, "Applied re- search is gathering of new knowledge that would aid in the betterment of human destiny". In short, the main aim of applied research is to discover some solution for some pressing practical problem.

3) Purposes of Quantitative Research

Quantitative Research aims to measure the quantity or amount and compares it with past records and tries to project for future period. The objective of quantitative research is to develop and employ mathematical models, theories or hypothesis pertaining to phenomena. Statistical methods are used extensively within fields such as economics and commerce.

4) Purposes of Qualitative Research

Qualitative research presents non - quantitative type of analysis. Qualitative research is collecting, analysing and interpreting data by observing what people do and say. The aim of Qualitative research is to

- i) study the culture and the educational practices
- ii) use a variety of data sources
- iii) reflect and provide possible answers to current issues and problems.

Significance of Research

All progress is born of inquiry. Doubt is often better than over confidence, for it leads to inquiry, and inquiry leads to invention" is a famous Hudson maxim. Research inculcates scientific and inductive thinking and it promotes the development of logical habits of thinking and organisation. Following aspects emphasises the significance of research.

1) Government policies

Research facilitates the decision of the Policy maker. Research provides the basis for nearly all government policies in India's economic system. **For example**, government's budgets rest in part on an analysis of the needs and desires of the people and on the availability of revenues to meet those needs. The availability of revenues to meet those needs. The cost of needs has to be equated to probable revenues and this is a field where research is most needed. Through research, a researcher can devise alternative policies and can well examine the consequences of

each of these alternatives.

Research as a tool to economic policy has three distinct phases of operation namely

- i) investigation of economic structure through continual compilation of facts ;
- ii) diagnosis of events that are taking place and the analysis of the forces underlying them; and (iii) the prognosis.

2) Allocation of national resources

Government has to chalk out programmes for dealing with all facets of the country's existence and most of these will be related directly or indirectly to economic conditions. The plight of cultivators, the problems of big and small business and industry, working conditions, trade union activities, the problem of distribution, even the size and nature of defense services are matters requiring research. Thus, research is considered necessary with regard to the allocation of nation's resources

3) Investigation of Economic Structure

Research is necessary for collection of information on the economic and social structure of the nation. Such information indicates what is happening in the economy, and what changes are taking place. Collecting such statistical information involves a variety of research problems.

4) Social welfare and progress

Ignorance and lack of knowledge is the root cause of various social mishaps. Common troubles, religious riots, the misnomer of social, racial superiority are results of ignorance. Through research it is possible to derive away with all these wrong nations. Research is helpful in the welfare and progress of humanity and the society. Research in social sciences is concerned with

- i) the development of a body of principles that helps in understanding the whole range of human interactions and
- ii) the practical guidance in solving immediate problems of human

relations.

In addition to the above, the significance of research is stated by considering the following points.

i) To those who pursue research in academic institution, research may mean a careerism or a way to attain a high position in the social structure.

ii) To professionals, research may mean a source of livelihood.

iii) To Philosophers research may mean the outlet for new ideas and insights.

iv) To literary men and women, research may mean the development of new styles and creative work.

The objective of exploratory research is to identify key issues and key variables. **For example**, one outcome might be a better system of measurement for a specific variable. If the researcher defines the study as exploratory research, then there is need to clearly define the objectives.

Qualities of a good research

A good research has to possess the following Qualities.

a) Systematic

Good research is systematic. It means that research is structured with specified steps to be taken in a specified sequence in accordance with the well defined set of rules.

b) Logical

Good research is logical. It means that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying our research.

c) Empirical:

Good research is empirical. It implies that research is related basically to one or more aspects of a real situation and deals with concrete data that provides a basis for external validity to research results.

d) Replicable:

Good research is replicable. This allows research results to be verified by replicating the study and thereby building a sound basis for decisions.

Types of Research or Classification of Research

Research may be classified according to its major intent or the methods.

I on the basis of internet, research may be classified as follows:

- i) Pure Research
- ii) Applied Research
- iii) Exploratory Research
- iv) Descriptive Research
- v) Diagnostic Research
- vi) Evaluation studies
- vii) Action Research

1) Pure Research

Pure Research is otherwise known as **basic or fundamental research or Theoretical research**. This research is undertaken for the sake of gaining new knowledge. It is a search for broad principles and synthesis without any immediate utilisation objective. It is mainly concerned with generalisation and formulation of theory as well. **Example: Newton's contributions, Galileo's contribution** etc.,

Pure Research is original in character or basic in character and has a formal science. It is undertaken for the sake of knowledge without any intention to apply it in practice. That is, it is not concerned with solving of any particular problem or practical problems. This is an intellectual exploration. It aims at extension of knowledge. 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. That is, the findings

of this research are used to form the basis for innumerable scientific and technological inventions. Pure research lays the foundation for applied research. Pure Research consists of two different ways of doing the development of existing theories. Pure Research is helpful in the discovery of new theories and

- i) Discovery of a New Theory
- ii) Development of existing Theory

i) Discovery of a New Theory:

Pure research might be of entirely a new discovery, the knowledge of which has not existed so far. Such discovery may arise from the researcher's own idea or imagination.

ii) Development of existing Theory:

This type of research is undertaken to improve the existing theory relaxing some of its assumptions or by reinterpreting a new theory with the existing theory as its basis. **For example** : Optimum theory of population is a development over **Malthusian** theory of population. Accordingly **Alfred Marshall's** definition is an improvement over **Adam Smith's** wealth definition which again be modified by **Lionel Robinson's** in theory.

Advantages

Following are the advantages of pure research

- i) It helps to develop general principle.
- ii) It offers solution to practical problems
- iii) Pure Research helps in constructing Research tools.
- iv) The outcome of the pure research has universal applications.
- v) It provides chance to frame standardised procedures for doing further research.
- vi) It enhances the development of many alternative solutions to the prevailing present and practical problems.

Limitations:

- i) It is a time consuming process. The Researcher has to spend more time to formulate or to frame theories.

- ii) It is very expensive
- iii) Formulation of hypothesis of tools is also difficult.
- iv) Pure research is not concerned with solving of any particular problem. Hence, this type of research is not used to solve immediate problems.

2) Applied Research

Applied Research is concerned with application of knowledge. It aims at finding a solution for an immediate problem faced by business of society. It is associated with particular project and problem. This type of research is aimed at finding solutions to the immediate problem, which are faced either by individual society, any business concern and the industries. Applied research suggests ways for the solution of social problems. Applied research is also known as **Action Research**.

Applied research aims at finding a solution to the current or long pending problem. It is carried on to find solution to a real life problem requiring an action or policy decision. Thus, it is a problem oriented and action - directed. It is concerned with actual life.

Applied Research is empirical in nature. The solutions found out through this research has local and practical applicability. It is concerned with research for amelioration of social problems.

Definition:

According to **Poulin Young** "Applied research" is gathering of new knowledge that would aid in the betterment of human destiny".

Applied Research is designed to solve practical problems of the modern world. The goal of applied research is to improve the human condition.

Applied Research is also known as **Action Research**.

Applied research can be further classified as

- i) Problem oriented research and
- ii) Problem solving research.

1) Problem oriented research :

This type of research is done by industry apex body for sorting

out problems faced by all the companies. In India, agriculture and processed food export development authority (APEDA) conducts regular research for the benefit of Agriculture industry.

2) Problem solving research :

This type of research is done by an individual company for the problem faced by it. Marketing research and market research are typical problem solving research. In short, the main aim of applied research is to discover some solution for some pressing practical problem.

Advantages

Following are the advantages of applied research

- i) Applied Research is aimed at solving immediate problems.
- ii) This Research is mostly reliable and objective in nature.
- iii) It is suitable to developing countries like India.
- iv) Time and cost involvement in doing this research is also less.
- v) Applied research may integrate the existing theories.

Limitations

i) Applied research is unduly localised research effort, the generalisations can not acquire a universal validity.

ii) It may produce wrong and unverifiable conclusions.

Differences between Pure research and Applied research

| Pure Research | Applied Research |
|---|--|
| <p>1. Meaning: Pure Research is undertaken for the sake of gaining new knowledge which is based on assumptions that all knowledge is potentially used.</p> | <p>This Research is undertaken for the betterment of human society and in this research, knowledge is accumulated for analysing and solving immediate and concrete problems.</p> |
| <p>2. Scope: Pure Research is very wide and broad.</p> | <p>This research is more specific in nature.</p> |

3. Solving of Problem:

Pure research is not concerned with solving of practical problem.

It is concerned with solving of immediate problem.

4. Aim:

It aims to contribute to theory and techniques of the discipline.

It aims to solve or ameliorate a problem

5. Period of Involvement:

Pure Research requires long term period involvement in the collection and analysis of information.

It is short term time bound and research oriented.

6. Time:

It is a time consuming process in the formulation of theories. In certain cases the Researcher has to delegate his entire life-time period for inventing theories.

It is not a time consuming process.

7. Financial outlay:

Pure research requires huge financial outlay

Financial outlay is less.

8. Report

Reports in technical language of the discipline

Reports in common language.

9. Approach

Pure research involves scholarly approach.

It is based on practical application.

10. Theoretical or practical based

Pure Research is based on theoretical abstracts.

Theory is applied to immediate problem solving efforts.

3) Exploratory Research

It is also known as **Formulative Research**. Exploratory research is an initial research which analyses the data and explores the possibility

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of obtaining as many relationships as possible between different variables without knowing their end applications. This type of research is applied when conclusive results could not be obtained in the first or preliminary level of study of the problem. 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 predetermined objectives".

Purposes

The purposes the exploratory research may be

- i) To generate new ideas
- ii) To increase the researcher's familiarity with the problem.
- iii) To make a precise formulation of the problem,
- iv) To gather information for clarifying concepts.
- v) To determine whether it is feasible to attempt the study.

4) Descriptive Research

Descriptive research is a fact finding investigation with adequate interpretation. It is a fact finding approach related largely to the present and abstracting generalisations by the cross sectional study of the current situation. It is the simplest type of research. It is designed to gather descriptive information and provides information for formulating more sophisticated studies. Data are collected by any one of the following methods: Observation, interviewing or Questionnaire.

Descriptive research seeks to provide an accurate description of observation of a phenomenon. It is a fact finding investigation with adequate interpretation.

The objective of descriptive research is to map the terrain of a specific phenomenon. It identifies relevant variables but does not aim at testing hypothesis. It applies statistical tools like averages and percentages. In social science and business research the term. "Ex post Facto Research" is used for descriptive research studies.

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It is conducted mostly in laboratories in the context of basic research. The main advantages of this research is that it provides the opportunity to identify cause and effect relationship. The Major limitation of this research is that studies are typically conducted in artificial laboratory settings. Results may not generalise or extrapolate to external settings. There are two exceptions to this rule

i) **Natural experiments** and

ii) **Field experiments.**

5) **Diagnostic study**

This is similar to descriptive study but with a different focus. It is directed towards discovering why is it happening and what can be done about. This study is concerned with discovering and testing whether certain variables are associated.

6) **Evaluation Studies**

Evaluation study is one type of applied research. It is made for assessing the effectiveness of social or economic programmes implemented for assessing the impact of development projects on the development of the project area.

7) **Action Research**

Action Research is designed to address complex and practical problems about which little is known. It 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 action research

i) the situation is studied

ii) corrective action is, planned and executed

iii) the results of the action are observed and recorded.

iv) the action is evaluated.

The process is repeated till a desired result is obtained. In action research effects of applied solutions are investigated and the theories are validated through practical application. Action research tries to improve or

set things right when regular work continues unlike other research activities where improvement is initiated only after the completion of the research activity. Types of Research according to methods of study :

II On the basis of methods of study, Research is classified as follows:

- 1) Experimental Research
- 2) Analytical survey
- 3) Historical Research
- 4) Surveys
- 5) Case study
- 6) Field studies

1) Experimental Research

Experimental research is designed to assess the effects of particular variables on a phenomenon by keeping the other variables constant or controlled. It is used to study the effect of set of factors on the response variable of a system of study. This research is conducted in a controlled environment and analysing using ANOVA. 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 is a dependent variable and the factors such as soil fertility, irrigation, Quality of seed, and cultural practices which influence the yield are independent variables.

2) Analytical Research

Analytical Research is normally undertaken in studying the business activities. Since raw data is weak and meaningless, they are thoroughly analysed.

Analytical study is a system of procedures and techniques of analysis applied to quantitative data. It may consists of a system of mathematical models or statistical techniques applicable to numerical data. Hence, it is also known as the **Statistical Method**.

Analysis reveals the relationship between or among variables, attributes, process forms and structure further analysis seeks similarity differences and connotations. A study on the financial performance of any financial and non financial company is an example of this type of research.

Objectives of analytical study

- i) To discover the internal functioning of a particular unit.
- ii) To explore the real among external, internal and mutual.
- iii) To discover the structure and units within the structure.
- iv) To understand how it is regulated, analysed and the result is served.
- v) To provide guidelines for further research.

Uses:

- i) This research is extensively used in business.
- ii) A researcher can use both quantitative and qualitative data for the analysis.
- iii) The researcher can have critical evaluation of facts and information already available.

3) Historical Research

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 means learning or acquiring knowledge through search back, it helps a researcher to study the society, its structure, process and fund. It is descriptive in nature. Its aim is to apply reflective thinking to unsolved social problems by discovering past trends of events, facts and attitudes, and by tracing lines of development in human thought and action. The study is more significant in predicting the future on the basis of past data. Historical research is aptly described as "the induction of principles through research into the past and social forces which have shaped the present"

Historical Research analyses the accurate records of how, when

and where the ends started, how they have progressed and when it was over.

Historical Research is applied in both pure and applied Research. The success of this research is dependent on the efficiency and sincerity of the researcher, availability of time and money and other resources which include data.

Definition

According to **Roert Murdick**" Historical research is concerned with establishing the occurrences of unique events"

In the words of **Walter R. Borgd**" Historical research is the systematic and synthesis objective location, evaluation and evidence in order to establish facts and draw conclusions concerning the past events"

Features

Following are the features of Historical research

- i) It is a systematic collection of information about the past events.
- ii) The time and location at which the incident happened is considered more while evaluating the particular problem.
- iii) There is evidence for the past events since records are made available.
- iv) A researcher can draw conclusions easily through evaluating the past events

Advantages :

Advantages of Historical research are given below.

- i) It provides base for solving large number of business problems.
- ii) Historical data are not repeatable hence evidence can be quoted.
- iii) This type of Research controls the researcher not to manipulate or create data.
- iv) This research enables the researcher to make use of time series analysis in predicting and solving of any future problem.
- v) Certain problems can be solved only through historical research.
- vi) It also provides ready made data for solving any type of problems

Limitations:

1) There may be non-matching situation. That is, solutions applied during the past for a particular problem can not be applied at present for the same problem.

2) There is every possibility of subjectivity to the interpretation which depends completely on past ideology.

3) There is over centralisation of past data which may be of misleading one.

4) There is every possibility of personal basis.

4) Surveys

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. The researcher is interested in knowing something about the whole population. Surveys require expert and imaginative planning careful analysis and rational interpretation of the findings. Survey research is mostly devoted to the study of characteristics of the populations under investigation. Survey research approached through the methods of personal interviews, mailed questionnaires and personal discussions besides indirect oral investigation.

5) Case study

A case study is the most popular method of research. A case study means a careful and complete observation of a social unit, be that a person, a family, an institution, a cultural group or even the entire community. A case study is a 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. 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 **Example:** a study of life style of working women; a study of urban poor, a study of refugees from another country, etc., This method is very useful to collect information about personal life of an individual or a group

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of persons. This method employs more techniques than one. It is very useful to develop ideas, concepts or testing concepts.

Definition

In the words of **Pauline V. Young**, "A comprehensive study of a social unit, be that unit, a person, a group, a social institution, a district or a community is called a case study."

According to Good and Hatt, "Case study method is a way of organising social data so, as to present the unitary character of the social object being studied".

Assumptions

Case study method of research is based on the following assumptions:

- i) Uniformity of human nature
- ii) Natural history of the unit
- iii) Comprehensive study of the unit concerned
- iv) It is applicable to each individual or to each member of a large group
- v) It is applicable only when there is homogeneity or some similarity evidenced in the making.

Features:

Features of case study method are given below:

- i) Case study method is applied to a single unit for the purpose of analysis.
- ii) This method is applied to study a particular unit intensively.
- iii) It is an integrated study of the social unit covering all facts.
- iv) This method is applied only to analyse qualitative factors.
- v) This method takes into consideration the mutual interrelationship of casual factors.
- vi) It helps to generalise social science.
- vii) It is flexible in nature as the researcher has the freedom to change or omit or distort the variables.

viii) It aims to study the behaviour pattern as it is a qualitative tool of analysis.

ix) It is a complementary study for getting proper solutions to the problems.

6) Field Studies

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 organisations and institutions.

Steps in Research Process

The steps involved in research process are detailed below.

- 1) Defining the research problem
- 2) Review of literature'
- 3) Formulating hypotheses
- 4) Research Design
- 5) Data collection
- 6) Data Analysis
- 7) Interpretation and inference
- 8) Research Reporting
- 9) Validation of Results

1) Defining Research problem

Problem can be defined as any situation where a gap exists between the actual and the desired state. Problem statement refers to a clear, precise and succinct statement of question or issue is to be investigated with the goal of finding an answer or solution. A problem need not necessarily mean that something is wrong in the current situation which needs to be rectified immediately.

A research problem refers to the practical difficulties which a researcher experiences in the area of either a theoretical or practical situation and wants to obtain a solution for the same. Defining Research

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problem is the process of identifying and pin pointing a specific problem which requires a detailed investigation. A research problem must be identified and defined without any ambiguity.

Following are the components of research problem. These components are listed by **R.L. Ackoff**.

- i) There must be some objectives to be attained at
- ii) There must be alternative means or course of action for obtaining the objectives.
- iii) There must be some doubt in the minds of a researcher with regard to the selection of alternatives.
- iv) There must be some environment to which the difficulty pertains.

2) Review of literature

Literature survey is the review of published and unpublished work from secondary sources in the area of interest to the researcher. Literature review comprises of **three steps**.

- i) Identifying the sources
- ii) Gathering relevant information
- iii) Writing up the literature review

3) Formulating Hypothesis

A hypothesis is a proposition that can be verified to determine its reality. A hypothesis is a tentative proposition relating to investigative approach. A hypothesis is a verifiable counterpart of a proposition. A hypothesis is an assumption about a population of the study. A hypothesis either describe the properties of variables or bring out the relationship between them.

Example : 1 Higher the income of respondents, higher the amount of savings. **Example : 2** Rainfall does not influence agricultural output.

Types of hypotheses

- i) Descriptive hypothesis
- ii) Rational hypothesis
- iii) Correlational hypothesis

- iv) Casual hypothesis
- v) Null hypothesis
- vi) Alternative hypothesis

Role of hypothesis

A hypothesis serves the following functions

- i) It guides the direction of the study.
- ii) It identifies facts that are relevant and those that are not relevant.
- iii) It suggests the most appropriate research design.
- iv) It provides a frame work for organising the conclusions of the findings.

Features

Features of a hypothesis are stated below

- i) Hypothesis should be defined clearly.
- ii) It must precise
- iii) The definition should be commonly accepted
- iv) The hypothesis must be clear, then only inferences drawn on the hypothesis shall be reliable.
- v) It must have scientific concept.
- iv) It should be based upon mental judgement.
- vii) It should be based on value judgement.
- viii) Hypothesis should state the relationship between variables.
- ix) Hypothesis must be stated in simple terms.
- x) It must be easily understandable.
- xi) It must give rise to the need for explanation.
- xii) It must be amenable to test within a reasonable time.

Definition

According to **Rummel** "Hypothesis is a statement capable of being tested and thereby verified and rejected".

In the words of **Good and Hatt** "A proposition which can be put to test to determine its validity"

4) Developing the Research Design

A research design is a plan of proposed study prepared by a researcher stating the research activities to be performed by the researcher for the proposed study before the researcher undertakes his research activities. The research design provides a complete guidelines for data collection. The researcher should consider

- i) the design technique
- ii) the type of data
- iii) the sampling methodology and procedures
- iv) the schedule and the budget.

Following are the essence of research design:

- i) Selection of research approach
- ii) Design of sampling plan
- iii) Design of experiment
- iv) Design of questionnaire

Types of Research Design

Research design may be of three types.

- i) Exploratory
- ii) Descriptive
- iii) Casual

i) Exploratory research design

Exploratory research design focuses on collecting data using an unstructured format or informal procedure to capture data and to interpret them.

ii) Descriptive research design

Descriptive research design uses a set of scientific methods and procedures to collect raw data and create data structure that describe the existing characteristics of a defined target population.

iii) Casual research design

Casual research design deals with collecting raw data, creating data structure and information that will allow the decision maker or re-

searcher to model cause-effect relationships between two or more market variables. The casual research design enables to identify, determine and explain the critical factors that affect the decision making. The research process is more complex, expensive and time consuming.

The Researcher has to prepare research proposal. The research proposal is an oral or written activity that incorporates decision made regarding the research work. It includes the choices the researcher made in the preliminary steps. A written proposal is often made when the study is suggested. It ensures the project purpose, methodology, time and budget.

5) Collection of Data

Data are the basic input to any decision making process in a business. Data are collected by adopting appropriate methods of data collection. The collected data must be adequate and reliable. The data could be from the entire population (census method) or from a sample in the case of large population. The data gathering begins with pilot testing.

Data can be gathered from a single location or from all over the world based on the research objectives and the resource allocation. The data collection method may be observation, questionnaires, laboratory notes and other modern instruments and devices.

Primary data can be collected either through experiment or through survey. If the researcher conducts an experiment, he/she observes some quantitative measurements, or the data, with the help of which he/she examines the truth contained in his hypothesis. But in case of survey, data can be collected by one or more of the following ways.

- i) By observation method
- ii) Through personal observation
- iii) Through Telephone Interview
- iv) By mailing of questionnaires
- v) Through schedules

Secondary data are collected from sources which have already

been collected for the purpose of first time use and future uses. The secondary data may be collected from internal sources and external sources.

6) Data Analysis

After the field work is over, the data processed, tabulated and analysed. Processed data are to be tabulated. The tabulated data are analysed by employing appropriate statistical tools. Statistical analysis determines whether the effects, relationships or differences are significant or not. Hypotheses are either accepted or rejected based on statistical analysis.

Analysis of data requires a number of closely related operations such as establishment of categories the application of the categories to raw data through coding, tabulation and then drawing statistical inferences.

7) Interpretation and Inferences

After testing the hypothesis through statistical analysis, the results are interpreted taking into consideration the past findings and present situations. An interpretation demands a thorough subject knowledge, analytical ability and common sense - Inferences are drawn from the interpreted data. Inferences are the final findings of the investigation.

The real value of research lies in its ability at certain generalisation. If the researcher had no hypothesis to start with, he might seek to explain his findings on the basis of some theory. It is known as interpretation.

8) Research Reporting

It is only through reports, the researcher communicates about the research work, findings and recommendations to the outside world. The report has to be prepared in the style that will be understood by the target audience. The report may be communicated by way of written or in an oral manner or through letters or through telephone calls or a combination of all. The layout of the report should be as follows :

- i) preliminary pages

- ii) the main text
- iii) the end matter

9) Validation of Results

After the interpretation of the data, the results must be validated by using past data. The process of validation of results ensures the credibility of the results. If there is any mismatch between the results of the model and that of the actual position in the past, then the assumptions and modelling exercise should be revisited till the results are validated.

Research Problem

The research process starts with defining the problem. It is the base on which the entire edifice of research stands.

The word "Problem" Originated from the **Greek word probelle** in meaning anything thrown forward, a question proposed for solution or a matter stated for examination.

A research problem refers to some difficulty experienced by the researcher in the context of either a theory or practical, situation which requires a situation.

Research is an organised endeavour. It requires proper planning. Planning of research means deciding the question or issue to be studied. Setting the objectives of the study and determining the means of achieving these objectives systematizes the research work.

Planning process

The planning state of a research work involves the following steps.

- 1) Selection of a problem for research
- 2) Formulation of the selected problem
- 3) Formulation
 - i) Developing title
 - ii) Building a conceptual mode
 - iii) Defining the objective of the study

- iv) Setting investigative Questions
- v) Formulation of hypothesis.
- vi) Operational definition of concepts.
- vii) Delimiting the scope of the study.

1) Selection of a problem for research

This involves identification of a few problems and selecting one out of them, after evaluating alternatives against certain selection criteria. All problems can not be called as a research problems. A problem may be called as a **Research problem** when it satisfies the following conditions.

- i) Problem must be worth studying
- ii) Problem must have viability or potentiality to stand as a Research problem
- iii) Problem must have social relevance.
- iv) The problem must bring the attention of experts and the policy makers.
- v) The problem must be in need of further exploration or explanation.
- vi) The problem must come out with pragmatic solution to the issues.
- vii) The problem must be relevant to the current occurrence or happenings.

Problem identification itself is a problem. The selection of problem is the first step in research. The term problem means a question or issue to be examined.

The problem selection arises when a student has to undertake research as a part of his course requirement.

The nature of the problem to be selected depends upon the level at which the research is done.

The problem is to be selected by the Researcher and is to be guided or supervised by the teacher. The guide has to help the researcher to help himself. He may dig out the researcher's area of interest and show him the way.

Sources of problems

The Sources of the problems are as follows:

i) Professional literature

When a researcher critically reads books, professional literature, and articles relating to the subject of researcher's interest, pertinent Questions may arise in his mind. When a researcher reads research reports, the areas of research may strike to his mind.

ii) Professional experience

Professional experience includes participation in conferences, seminars and workshops. This professional experience could be a good source of identifying problems. Fellow students and professors will suggest many stimulating problems to be studied. Sharing to research, reports may also lead to identification of unexplored areas of research.

iii) Daily experience

Life is dynamic. We learn new things and undergo new experiences every day. The story about **Newton justifies to this - Law of Gravitation.**

According to **David and Nachimias and Chava**" It is a mark of scientific genius to be sensitive to difficulties where less gifted people pass untroubled by doubts"

iv) Research

Research on one problem may suggest problems for further research.

v) Intuition

Sometime new ideas may strike to one's mind like a flash. Reflective mind is a spring of knowledge.

vi) Inferences from theories and laws

In certain cases, a deep probable into the established theories of law may lead to new frontiers of knowledge.

vii) General sources

Other sources may be intellectual puzzles, social problems,

counter intuition, defiant empirical cases, new methods, new social and technical developments, social trends and sponsors.

Process identification

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

i) Selection of the discipline

The discipline or subject in which one proposes to do research may be selected. **Example:** Economics, commerce, Management, etc. The selection of the discipline is easy. One has to select the discipline in which the researcher has specialisation.

ii) Demarcating the broad area or a particular aspect of the selected subject.

This is the second step in the process. In this step the researcher has to select a particular aspect of the selected subject **Example :**

A researcher may select the discipline banking. In this he has to select the particular aspect such as Resource mobilization, E-banking, innovative banking products, core banking solution, service Quality of banks, etc.,

The researcher has to select his specific area of interest.

iii) Identifying two or more specific topics in the selected broad area.

A review of concerned literature including research theses and survey of research published by the Research councils like Indian Council of Social Science Research, intensive reading and reflective thinking and discussion with the guide will help a researcher in identifying specific topics or issues for research. Before selecting a particular area, the researcher has to evaluate them for choosing the most appropriate one. While selecting a particular area, a researcher has to consider the following criteria.

i) Internal criteria or factors and

ii) External criteria or factors

Internal criteria consists of

- a) Researcher's interest
- b) Researcher's competence and
- c) Researcher's own resources

External criteria consists of

- a) Researchability of the problem
- b) Importance and urgency
- c) Novelty
- d) Feasibility
- e) Facilities
- f) Usefulness and social relevance
- g) Research personnel

2) Formulation of the selected problem

"A problem well put is half - solved". This reveals the importance of proper formulation of the selected problem. Formulation means translating and transforming the selected research problem in the scientifically researchable question. Formulation of selected problem gives a direction and a specific focus to the research effort. This step prevents the researcher from indiscriminating gathering of data. It is concerned with specifying exactly what the research problem is and why it is studied.

According to **Merton**, Formulation identifies three principal components

- 1) Originating question
- 2) Rationale of the question
- 3) Specifying Question

1) Originating Question

Originating question indicates what the problem is. There are two types of research problems

- i) Problems which relate to states of nature and
- ii) Problems which relates the relationship between variables. It may call for discovering new and more decisive facts relating to the subject matter of study, it may be related to empirical validity ; or it may be related

to the structure of an organisation.

2) Rationale of the Question

Rationale refers to the statement of reasons why a particular Question is posed. It 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" - **Bridgman, Pucyw.**

3. Specifying Question

The originating question is decomposed into several specific questions in order to identify the observations that will provide answer to them. These specific questions are known as **investigative questions**. These specific Questions should be simple, pointed, clear, and empirically verifiable.

Techniques involved in defining the problem

Following are the techniques, involved in defining the problem.

- i) Developing title
- ii) Building a conceptual model
- iii) Defining the objectives of the study
- iv) Setting investigative Questions.
- v) Formulation of hypotheses
- vi) Operational definition of concepts
- vii) Delimiting the scope of the study.

i) Developing title :

The title should be carefully worded. The title should indicate the core of the study, reflect the real intention of the researcher and shown on what is the focus. **Example**, Resource deployment of commercial banks in Tirunelveli District. Here, the focus is given on commercial banks.

The geographical area of the study is also to be stated. In the above example, commercial banks located in Tirunelveli District is the geographical area of the study

ii) Building a conceptual model

The conceptual model gives an exact idea of the research prob-

lem 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. A researcher can grasp and comprehend the nature of the research problem only when the researcher has adequate background knowledge. Hence, specialisation of the particular area is required.

iii) Defining the objectives of the study.

A researcher has to define the objectives of the present study or research. In the process of identifying the objectives of the research, the researcher must finalise the following:

- i) Research questions
- ii) Hypotheses
- iii) Boundary of the present study.

iv) Setting investigative Questions

Once the objectives of the study have been defined, the formulation moves to investigative Questions. These Questions are to be set up for each of the major research objectives.

v) Formulation of hypotheses

Hypothesis is a proposition, assumption or a tentative answer and is formulated to focus the research and to keep the researcher on the right track. Hypotheses are either accepted or rejected based on the significance of statistical results. The data collected may or may not support the hypothesis. Hypothesis aims at answering the research Questions.

vi) 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. The operational definitions of concepts and measurement devices enable the researcher to decide exactly, the data needs of the research.

vii) Delimiting the scope of the study

This means demarcation of the scope and dimension of the study.

Types of Research problems

Following are the types of Research problem.

- 1) Empirical problems
- 2) Analytical problems
- 3) Normative problems.

1) Empirical problem

Empirical problems are the problems which can be studied through the use of sensory organs like eyes, ears, nose, tongue and touch. Mostly such problems are studied through the observation technique of collecting the information.

2) Analytical problem

Analytical problem is otherwise known as conceptual problem. These problems are not scientific. This kind of problem can be studied through the creative thinking of a Researcher. In order to study such problems, the Researcher should collect data, process the data, make use of statistical tools and thus, draw out inferences about the problems of the problem.

3) Normative problem

Normative problems are the problems for which answers to the Questions depend upon value judgements.

Characteristics of a good research problem

Research objectives are the goals to be achieved by conducting the research. They may be stated as 'general and 'specific'

i) Researcher's interest :

The selection of the problem for investigation depends upon Researcher's interest in terms of his ability, attitude, spirit, dedication and the like.

ii) Availability of resources:

The importance of the problem depends upon the practical availability of **time, money and other resources** to be carried forward.

iii) Theoretical or practical problems

The Researcher has to select a topic in a field in which he has familiarity and indepth understanding. If he has to undertake applied research, the Researcher must be in a position to attract the attention of the people in the field in which they have to take people in the field in which they have to take policy decision. Hence, selection of either a theoretical or practical problem may have significance.

A good research problem must possess the following characteristics

- 1) There must be perfect clarity over the problem. Further, the problem should not have divergent expression and should not be confusing either to the Researcher or to the respondent.
- 2) Research should be guided by logic. There should be an association between or among variables and which must be established in a logical manner. The problem should also be amenable for further study.
- 3) Research is always related to one or more aspects of real life situations. The problem and the study must be in a position to highlight the nature, the extent and implications of such a problem.
- 4) The results or solution narrated by the researcher should be verified in terms of time and occasion and society.
- 5) The problem to be studied must be interesting to the researcher, respondents and the readers.
- 6) The scope of the study either micro or macro depends upon the research time and the availability of other resources.
- 7) There must be quantitative and qualitative relationship between or among variables. The quantitative relationship may be studied through positive relationship. The qualitative relationship are studied through presence or absence of particular attribute.

Approaches to find a problem

Problem concerning day to day life may be identified on the basis of experience and prevalence. Normally Researcher is expected to identify the current or burning problem at a time it burns or occurs.

1. Theories in social science :

There are lot of theories available in social science. **For example:** **Maslow's** need hierarchy theory of motivation for employees. Malthusian theory of population which was replaced by optimum theory of population, etc., These theories are the basement for studying several problems through research. Therefore, a researcher may select a problem for investigation from the base of the above theories, in which the researcher has been interest.

2) Ask Experts :

To identify the problem area, a researcher has to ask the experts in the areas in which they have expertise knowledge and interest. Thus, the researcher can get the guidance of experts for identifying the research problem

3) Researcher as a specialist in a particular field,:

The Researcher himself may become an expert in a particular field of knowledge and hence he can identify several problems in that particular area.

4) Search for literature

The Researcher should read professional journals, Research reports, dissertations, magazines, articles, newspapers and the like. Further, the researcher can find answer to the unanswered questions in the literature. Some times the researcher may also find solutions in order to get corrected research work.

5) Identify the areas of dissatisfaction

The Researcher should read critical article appear in periodicals and newspapers. This will enable the researcher to identify several problem areas.

6) Current development

Current development in a particular field of knowledge provide scope for many topics for doing Research. In some other cases, the Researcher himself become specialised in current areas like, Banking sector, Information Technology sector, mutual funds, and the like.

7) Maintaining a diary

The Researcher should maintain a diary at all times and make a note of important events, ideas and discussions that arise in his mind. Further whenever the Researcher involved in discussions with elite people and the information received from them may also be noted in the diary immediately at the time when it is received.

8) Refer to improvement in the technology :

Fast change in the economic condition of the country and its people lead to change in the technology like introduction of electronic automatic machines, computers, innovations in the industries, pollution control measures, modern cultures and the like. Hence, the researcher may identify problem in these areas.

Identify new areas of innovation

The Researcher can also identify new areas which are not explored so far.

The Researcher can examine the gap between theory and practice.

The Researcher can also identify problems by re examining the theory in the areas in which he has interest.

Selection of a Research Problem

1) While selecting a research Problem

Researcher should exercise utmost care and caution. The Researcher can dedicate even 20% of his research time for selecting the right problem.

2) Further, the research problem rightly and rationally selected has unlimited advantage and may boost the morale of the researcher in completing the project in a successful manner within the time and cost limit.

3) It will help the researcher to proceed the research work methodically and step by step. The right selection will help the researcher to avoid unnecessary modification, omissions and additions.

4) The seriousness of the research work will keep alive till completing the project. In addition to this, right selection of research problem ensures clarity of thought, logic and systematic analysis. This will also justify the title.

Factors to be considered while selecting the Research problem

The researcher should undertake a preliminary survey of the literature before the selection.

The researcher should not select a topic of controversial subject.

Vague problems should not be selected .

According to **Pauline V.Young**, the following factors are to be selected while selecting a research problem.

a) The ability of the Researcher to grasp the factors required for completing the same.

b) The Researcher should think of resources to be carried forward for doing basic research in terms of cost, time and data.

c) When the required information are not available, the researcher may not be in a position to complete the research work. Therefore, the researcher has to select a topic in which sufficient secondary information are available.

d) While selecting the problem, the researcher should also consider the availability of statistical tools to analyse the problem.

Example : Chi-square test, Correlation, Time series analysis, testing of hypotheses and the like.

e) While selecting the problem, the researcher should also consider the degree of accuracy. required. **Example** : Null hypotheses may be at

2%, 5%, 10% as significant levels.

At the time of final selection, the Researcher should consider the following points.

- i) Whether he has sound background to carry out the Research
- ii) Whether he has consideration for the cost and time bound.
- iii) A new researcher has to select a simple problem.

iv) One has to consider the availability of library facilities like news-
paper, magazines, Articles, Periodicals, Dissertations, books and the like.

Need for studying the problem

The result of the study must be used for solving a particular problem or prevailing problem. Therefore, the researcher should consider the need for studying the problem.

Example:

- a) Pollution control measures to be undertaken.
- b) Financial performance of a particular company.

5) Benefits of the Research

The institution of sponsoring Authority of the research study should derive benefits out of the study.

6) Problem rightly selected

The researcher need not be in hurry in choosing the problem for the study. He can spend more money and time in selecting a particular problem and that would not be a waste at all. The problem rightly and rationally selected will enhance saving of money at a time in the later stage of the research.

7) Over enthusiastic

Researcher need not be over enthusiastic while selecting the topic when he is too ambitious, it may be a danger to him in the completion of the research work.

Research Methodology

Research methodology is a way to systematically solve the research problem. It is a science of studying how research is done scientifically.

tifically. It is the way a research problem is systematically solved employing the relevant research methods. A system of models, procedures and techniques used to find the results of a research problem is called a **research methodology**. Here, methodology decides the usage of various methods available.

Research Methods

Research methods are the techniques the researcher employs in conducting research. Techniques to collect data, statistical tools to analyse the data and the procedure used to evaluate and compare the results are known as **research methods**. Analyses of historical records or documents for comparison and evaluation of the current results constitute the evaluative techniques.

Research methods refer to all those methods, techniques that are used for conduction of research. It refers to all those methods which are used by the researcher during the course of studying his research problem are termed as research methods. Research methods refer to the behaviour and instruments used in selecting and constructing research technique.

Business Research

Business research is applying the techniques and rules of science to the art of management. Business research is a systematic inquiry that provides information to guide business decisions. The studies included in business research may be reporting, descriptive explanatory or predictive.

Need to study Research in business

1) Business competition

In the modern world, every product has its competition. Competition in business is increasing day by day. To know about customers, products and industry competition.

2) Customers

To be successful in business, a concern must know its customers

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clearly. To know about the customers and their needs, their perception and future requirements, Research is needed. Research helps to find out the variable and factors which are significant for increasing customer loyalty and adding new customers.

3) **Economical data collection:**

Lower cost data collection better visualisation tools, powerful computations, access to knowledge make things different for decision makers.

4) **Technology**

Changes are taking place rapidly in work patterns and relationships doing away with geographical borders. This necessitates the need for business research.

5) **Global competition**

Due to globalisation, competition is growing and often coming from unexpected sources. To safeguard the business, many organisations refocus on primary competencies. To compete with global market business concerns seek to improve operations by reducing cost and converting customers to advocates.

6) **Business environment**

Business environment is the totality of all those factors which affects the business. Factors such as economic system, economic anatomy, Government legislations, Government policies, movement of policies, velocity of policies, fiscal and monetary policies, social values and systems, social structure, etc., affect the business. To analyse the environment, business research is needed.

7) **Stakeholders demanding greater influence**

Stakeholders of a company are to be included in company decision making, armed with extensive information. To provide the required information, Business research is essential.

8) **Analytical talent**

Business research provides new mathematical models and highly

sophisticated software. These models help to face complexity in decision making.

9) Provides information

Business research is a systematic inquiry that provides information to guide business decisions. The studies included in business research may be reporting, descriptive, explanatory or predictive.

Scope of Business Research

Business Research helps business managers to take decisions in all the functional areas.

1) Marketing :

Business research is applied to the following activities:

- i) Demand forecasting
- ii) Consumer buying behaviour
- iii) Measuring effectiveness of advertisement
- iv) Media selection
- v) Test marketing
- vi) Product positioning
- vii) New product potential etc.,

2. Production

Business Research is applied to the following activities.

- i) What to produce
- ii) How much to produce
- iii) When to produce
- iv) For whom to produce
- v) How to improve Quality control
- vi) Reduce inventory cost, etc.,

3) Materials:

Business Research is applied to the following areas in the field of materials.

- i) Where to buy

- ii) How much to buy
- ii) when to buy
- iv) At what price to buy

4. Finance

Business Research is applied to the following activities.

- i) How to manage the working capital
- ii) How to judge the debt equity ratio or
- iii) How to improve the accounting procedure.

5. Human Resource Development

Business Research is applied to the following activities.

- i) Man power planning
- ii) Incentive schemes
- iii) Employment trend
- iv) Turnover
- v) Performance appraisal, etc.

6) Government

Business Research is applied to the following areas to Government.

- i) Budgets
- ii) Planning
- iii) Fiscal policy
- iv) Resource optimisation, etc.,

Limitations of Business Research

Business Research has the following limitations.

1) Uncertainty

All business operate in the world of uncertainty. Hence, business research has uncertainty.

2) Unexplained principles

There are certain grey areas like psychological and social as

pects of human resource in management and these aspects have unexplained principles.

3) Difficulties in replication

Normally, scientific investigations are required to be repeated several times to draw valid conclusions. But, in behavioural science replication under similar conditions is a difficult process

4) Bias in observation or interpretation

There may be possibility to have bias in observation or interpretation of data in management science. It may also influence the decision of the investigator.

5) Difficulties in measurement

The tools or techniques of measurement in social science are not absolutely perfect. Hence, it is very difficult to measure the level.

6) Lack of actionable result

Business research provides a number of facts or a set of guidelines but it rarely indicates actionable results.

7) Inadequacy:

In case of cause - effect phenomenon, there are some inadequacy in establishing the cause - effect relationship.

8) Controlling scientific methods

Scientific method demands controlling of extraneous factors. But practically in business management, it is not possible to keep all the extraneous factors under control.

9) Complex human behaviour

Managing men is the essence of management. The complex human behaviour includes scientific explanation as no two persons behave in the same manner under similar conditions.

CHAPTER: 2.

RESEARCH DESIGN

After the selection and formulation of a research problem, the next task of a researcher is to work out a research design. Like an architect prepares a plan before construction, an army prepares a war strategy before war operations, a researcher has to make a plan of study before starting the research work. This plan of study of a researcher is called as Research Design. In other words, Research Design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research proposals with economy in procedure. It may also be considered as the specification of methods and procedures for acquiring the information needed. So, a research design should cover the following aspects: Firstly, the design specifies the sources and types of information relevant to the research. Secondly, it will specify the approach needed for gathering and analysing the data. Thirdly, it also includes the time and money needed for the successful completion of work. However, it is to be noted that it is not possible to generalise a common research design. It follows that research designs will differ depending on the purpose of the research.

Research Design and Research Problem :

There are different methods of formulating research problems depending upon the specific purposes. The type of research design depends on the nature of problem. The research studies may be classified into the following.

- 1) Formulative or exploratory studies.
- 2) Descriptive studies
- 3) Experimental studies.

The research design for each of the above study varies. The explanatory design may be required for studying the problems of explanatory nature. A descriptive design may be essential for the studies relating to the description of certain characteristics of groups or situations. Similarly an experimental design may be required for the studies to test a hypothesis of casual relationship among variables.

However it must be noted that all research design has to answer to the following questions.

1. What the study is about?
2. Why the study is being made?
3. Types of data required?
4. Where the data can be found?
5. Where or in what areas the study will be carried on?
6. What period of time the study will include?
7. How much material or how many samples will be needed?
8. What basis of selection of sample will be used?
9. What techniques of gathering data will be used?
10. How will data be analysed?

Thus the consideration which enter into the decisions regarding what, where, when, how much, by what means, constitute a plan of study or a research design. However the research design has to be geared to the available time, energy and money.

However while formulating R design, one should be with
However, it is stated that there is no such a thing as a single standardised research design. It is not a highly specific plan to be followed without deviations, but rather a series of guide post to keep one going in the right direction. In other words, a study design is always tentative. As the study progresses, new aspects, new conditions may come to light and it is necessary to change the plan as the situation warrants.

Components or Steps in the Preparation of Research Design :

The following are the important components of research design. They are not mutually exclusive but interdependent in nature.

1. Sources of information to be tapped :

The sources of information to be tapped depends upon the type of study. There are 3 major sources, namely, documentary sources of both official and unofficial nature, personal sources and library source. The documentary sources of information are those which are available in published and unpublished forms, reports, statistics, manuscripts and letters, etc. These sources may be either primary or secondary. The primary sources are those from which collections are made first hand. Data from primary sources may be collected by participant observation, personal interview correspondence, questionnaire etc.

2. Nature of study:

The research design depends upon the nature of study whether it is statistical study or a case study or a comparative study or experimental study or a combination of all of them.

3. Objectives of the study :

The objective of the research study differs from the nature of studies. The objectives of the study should be very clearly stated. The objectives may be to gather descriptive data or explanatory data or others. In some cases, hypotheses may be formulated and tested.

4. Geographical area to be covered :

The physical boundaries of the area have to be specified in the research design.

5. Socio-cultural context of study :

If the studies are relating to the human beings, it is necessary to ascertain the socio cultural behaviour pattern of the people.

6. Period of time to be covered :

It is necessary to ascertain the time dimensions of the study or the period of time to be encompassed, so that exploration of the problem will be easier and clear.

7. Dimensions of the study :

It is essential to make clear about the number of cases to be studied. The limitations of the proposed investigations should also be clearly mentioned in the research design.

8. Bases for selecting the Data :

Depending upon the time and cost factors, the basis for selecting the data have to be decided. It is more economical and efficient to base studies on samples rather than universal study. But the sample should be the representative of the universe. The

size of sample do not necessarily reflect the representative characteristics of the universe studied.

9. Techniques of Study :

A suitable technique for collecting the necessary data is to be determined. The techniques adopted may be observation, schedules and interview, questionnaire, or the combination of them. The choice of the technique depends upon the accuracy of data required, size of sample, geographical area to be covered etc.

Research Design for Exploratory or Formulative studies :

The exploratory studies have the purpose of formulating a problem for precise investigation or for developing hypothesis. In other words, the purpose of exploratory studies is to achieve new insights into phenomenon. The exploratory studies are always attempted in those cases or problems for which only little knowledge or informations are available. The following methods may be adopted for exploratory studies.

- 1) a review of the related social science and other pertinent literature.
- 2) a survey of people who have had practical experience with the problem to be studied.
- 3) an analysis of 'insight stimulating' examples.

1) Review of Literature or Survey of Literature :

One of the easiest ways of economising effort in an enquiry is to review and build upon the work already done by others. It is essential to review all the relevant material connected with the problem chosen so as to show how the problem under study

relates to previous research studies. It is also equally important to show how this work differs with the existing literature. In an exploratory study, the focus of review may be on hypotheses that may serve as leads for further investigation. Hypotheses may have been explicitly stated by previous investigators and in the light of their usefulness, it is necessary to consider whether they suggest new hypotheses. In those cases, where hypotheses have not been formulated, the task is to review the available material with sensitivity to the hypotheses that may be derived from it. The sensitive descriptions to be found in the works of creative writers are also a fertile ground of hypotheses for study.

2) The Experience Survey :

It is often found that only a small proportion of existing knowledge and experience are available in written form. But the everyday experiences of many people are helpful to observe the effects of alternative decisions and actions with respect to problems of human relations. Such reservoir of experience could be tremendous value in helping social scientists to be aware of the important influences operating in any situation that may be called upon to study. The basic objective of such experience survey is to gather and synthesise such experiences in the research work.

3) The analysis of 'insight stimulating' examples :

In certain relatively unformulated areas, lack of much experience to serve as a guide it is only the intensive study of selected examples have been found to be fruitful method for stimulating insights and suggested hypotheses for research. For example, the remarkable theoretical insights of Sigmund Freud were stimulated by his intensive studies of patients. So, the researchers have found that the study of a few instances may produce a wealth of new insights whereas a host of others will produce new ideas. Although, no simple rules can be estab-

blished for the selection of the instances to be studied, the experience indicates that for particular problems certain types are more appropriate than others.

However it is important to note that exploratory studies merely lead to insights or hypotheses, and they do not test or demonstrate them. An exploratory study must always be regarded as simply a first step, and very careful and controlled studies may be needed to test whether such hypotheses have general applicability.

Research Design of Descriptive studies :

The basic aim of the descriptive studies is to portray the characteristics of a particular group or communities or situations. The descriptive studies may relate to the people of a community, their age distribution, their national or a social background, the state or their physical, or mental health, the educational status etc. The study may also be, related to the working conditions in a factory like health, safety and others. A descriptive study may also be on the attitudes or opinions or views of a certain group of people towards anything. A descriptive study involves the following steps.

- i) Formulating the objectives of study
- ii) Defining the populations or universe
- iii) Selecting the sample
- iv) Designing the methods of data collection
- v) Analysis of data and results.

Research Design for Experimental Studies :

The purpose of experimental studies is to test a hypothesis of casual relationship between variables. In an experimental study, two groups are compared in terms of the experimental variable. The validity of the assured effect of the experiment depends on the equivalence between the chosen control group and the chosen experimental group. There are two ways of assuring this equivalence, namely, randomisation and matching.

Advantages of Research Design :

The preparation of research design has the following advantages.

1. It saves researchers time, energy and money.
2. It helps to prepare and execute the various activities systematically.
3. It helps for the better documentation of the research activities.
4. It ensures a proper time schedule for the project.
5. It provides confidence and hope for the researcher to complete the work.
6. It provides satisfaction and sense of success at the completion of every stage of the work.

Model Questions :

1. Discuss the role of Research design in carrying out a research project.
2. What are the requirements of research design for descriptive and Exploratory studies?

CHAPTER 3

DESIGN OF SAMPLE SURVEY

Primary data may be collected by any one or more of the following methods.

The required information for the study or research may be obtained by following either

- 1) Census method or
- 2) Sample method

1) **Census method:**

Under Census method, data are collected for each and every unit of the population or universe which is the complete set of items which are of interest in any particular situation.

This method is also known as **complete enumeration survey method**.

Population:

Population is an identifiable total group or aggregation of elements that are of interest to the researcher and pertinent to the specified problem. A population or universe may be defined as a set of data that consist of all hypothetically possible observations of a certain phenomenon population which may be homogeneous or heterogeneous. The most popular **example** is the population census undertaken by Government of India periodically.

Merits of census method:

Some of the merits of census method are given below:

1) **Reliability:**

Data are obtained from the universe. The results obtained are likely to be more representative and reliable.

2) **Universe :**

Data are obtained from each and every unit of the population.

3) **Suitability:**

This method is suitable to obtain rare events such as areas under

some crops and yield thereof, the number of persons of certain age groups, their distribution by sex, educational level of people etc. This method is effective if the universe is small. This method can be adopted where other methods can not provide accurate result.

4) Detailed information:

Census method gives more and detailed information than sample method.

5) Accurate information:

Information can be collected from each and every unit of the population. The results of a complete enumeration are expected to be more accurate than sample method.

6) Basis

Census method can be widely used as a basis for various surveys.

7) Intensive study:

Census method completely examines each unit and gathers important data for intensive study.

8) Heterogeneous Units

Census method is applicable to examine heterogeneous units.

Demerits:

Every coin has two sides. Hence, this method is not free from limitations. Following are the demerits of this method.

1) Expensive :

Under Census method, data are collected from each and every unit of the population. Hence, much expenses are to be incurred for census surveys etc. Therefore, census method of data collection is expensive. Hence, it is very costly method of data collection.

2) Excessive time and energy :

The effort, money and time required, for carrying out complete enumeration will be generally, extremely large, or prohibitive. This method consumes more time and more work to complete the collection of work.

3) Unsuitable:

If the population is infinite or the evaluation process destroys the population unit, this method can not be adopted. This method is also not applicable or suitable when the universe is large.

Sampling Method

In sampling method, only a part of the population is studied and conclusions are based on the data or information collected from that part of the population.

Meaning:

Sampling is the process of learning about the universe (population) on the basis of representative items (samples) drawn from the universe, when the researcher collects data from representative items of the universe, this is called as a **sampling method**. A sample is the subject of population units.

It is the process of accumulating sample from the population. The process may either be probability or non probability sampling.

Sampling refers to the selection of part of an aggregate or totality on the basis of which a judgement or inference about the aggregate or totality is made.

Definition:

Goode of Hatt "A sample is a smaller representation of larger whole".

Ya Lun Chou "Sampling is a collection of primary units selected as a representative micro from which inference about the population may be made".

Sampling is defined by **Snedecor** as follows:

"A car load of coal is accepted or rejected on the evidence gained from testing only a few pounds. The physician makes inferences about a patient's blood through examination of a single drop. Sample are devices for learning about large masses by observing a few individuals"

Basic principles of sampling:

1. Law of statistical Regularity :

This principle is derived from the mathematical theory of probability. This principle states that if a sample is taken at random from universe (Population), it is likely to possess almost the same characteristics as that of the population.

"The Law of statistical regularity lays down that a moderately large group are almost sure on the average to possess the characteristics of the group" - King.

2. Law of Large numbers :

This law is related to the law of statistical regularity.

According to this law, other things being equal , the larger is the size of the sample, then greater is the amount of accuracy. It is also known as law of **Inertia of Large Numbers**. If data are large enough, it is likely that all the individual items would move in the same direction.

Differences between Census method and Sampling method

1. Census method is total enumeration of all individual units. Sample is part of two universe.
2. Some census requires complete enumeration, budget of time and money will be higher. But sample requires minimum time and money.
3. The study will be perfect when census method is applied. But there is possibility of bias and sampling errors by the type I error and type II error in the sampling method.
4. The data collected through census method are more reliable. Since part of the population is accumulated, the sample itself may not be reliable.
5. Census method yields much more information than sample method.
6. For studying problems like criminality etc., the census method may not be adopted.

Factors :

In making the decision of Census or sampling method, following factors are to be considered:

- 1) The size of the population.

- 2) Amount of funds Budgeted for the study
- 3) Facilities
- 4) Time

1) The size of the population

If the population to be studied is small (say 50 or 100 or 500), the researcher or enumerator may decide to study the entire population. For this, small universe, sample is not required.

When the population to be studied is large, then the researcher may select sample method. The size of the 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. In case of sampling method, less cost is incurred. But in case of Census method, it is more expensive.

3) Facilities:

The selection of sampling or census method depends upon the facilities available to the researcher or enumerator. Facilities include availability of staff access to computer facility and accessibility to population elements etc. If these facilities are available to a researcher, then census method may be adopted. If these facilities are not available to a researcher, then sampling method is to be followed.

4) Time :

The selection of census method or sampling method depends upon the time within which the study or research is to be completed. If the time available to a Researcher is less, then he may select sample method. On the other hand, if the time available to a researcher is more sufficient to complete the research, the census method is to be adopted.

Dr.A.L.Bowley says that in collection of statistical data **common sense** is the chief requisite and experience the chief teacher.

SAMPLING TECHNIQUES

CENSUS METHOD AND SURVEY METHOD

The primary purpose of research is to discover the principles that have universal application. So, research always needs adequate and accurate data. Survey method is a device for collecting data or factual information of certain desired characteristics of an universe. There are two methods of survey namely census method and sample method. The census method involves a complete enumeration of all the units of the population or universe, whereas the sample method involve the enumeration of only a sample part of the population or universe.

Although census method may yield correct factual data, for various reasons, it may be incomplete, inadequate, and inaccurate. Moreover it is costly and time consuming process. So, complete or census survey are unattainable in practice for all the cases. So sample technique is used in all sphere of life.

Meaning of Sample :

A sample is a smaller representation of a large unit or value. In other words, a sample is that part of the universe or population which we select for the purpose of investigation. In the ordinary business of life, we make judgements and take decisions only on the basis of samples. When we go to a shop, we examine a handful of rice to find the quality of rice in the whole bag. A doctor examines only a few drops of blood to draw conclusions about the blood constitution of a body. A business man places orders for a commodity by examining only a few units of the same as sample.

SAMPLING TECHNIQUE

The process of selecting a sample is called sampling technique. There are various methods of selecting samples. The choice of any one particular method depends upon.

1. The nature of the problem under study or consideration.
2. The nature of the population or universe from which sample is to be drawn.
3. The uses for which the results obtained from the sample study are likely to be used.

Sampling Theory or Va'idity of the sampling :

There are two important principles upon which the theory of sampling is based. In other words, the validity of the sampling or the whole of the theory of sampling is based on two general laws.

1. The law or the principle of statistical regularity.
2. The law or the principle of inertia of large numbers.

1. The law or the principle of statistical regularity :

It states that a reasonably large number of items selected at random from a large group or items will be the average representative of the characteristics of the large group or population.

2. The law or the principle of inertia of large number :

It is a corollary of the previous law and it states that large groups or aggregate of data show a higher degree of stability than smaller ones. In other words, the movements of all the separate components of the aggregate reveal a tendency to compensate one another, some probably moving higher and others lower.

However it should be noted that they are merely two principles and not laws in the strict sense of the term. But they are the tendencies

which operate universally and appropriate more to short periods only.

STEPS IN THE SAMPLING :

The process of selecting the sample or sampling consists of several steps or procedure. They are as follows.

1) *Defining the survey population or universe :*

The survey population or universe is to be defined in terms of element, nature, units, extent, time etc.

2) *Specifying the frame of Sampling :*

The various elements of population or universe are represented in the list, or map or directory. It is necessary to specify and choose the sampling frame suitably. *once the samp unit is chosen the*

3) *Specifying Sampling unit :* *third step is preparing the source list to cover all the samples in the sampling frame*

The necessary sampling unit is to be selected among the whole unit of population or universe. It may consist of one or several elements of population. *which is the rep of the popu*

4) *Specifying method of Sampling :*

Now the method by which the necessary sampling units are selected is to be described.

5) *Determining the size of Sample :* *sign 110 m.B.A*

The size of sample or the number of element of the population or universe to be sampled is chosen. *method*

6) *Deciding the Sampling Plan :*

The plan or operational procedures for selecting the sampling units have to be decided.

7) Actual selection of sample :

The actual selection of the sample is carried out in the field with the necessary facilities like investigators, etc.

SAMPLING TECHNIQUES OF METHODS OR TYPES OF SAMPLING :

The techniques of designing samples can be broadly classified into two types.

I. Random or Probability Sampling.

II. Non-Random or Non-probability Sampling.

I) Random or Probability Sampling :

This is the most simple procedure of drawing a sample from a given population or universe. The sample units are drawn at random without showing any regard to the characteristics of population units. Random is not used in the sense of haphazard or hit or miss. By random selection, we mean that each unit or item of the population has equal or known opportunity of being included in the sample. So, it is also known as equal probability sampling. Although the process of selection is random in character, it has often been observed that a random sample is usually a representative sample and gives reasonably accurate data or information.

Random samples are further classified into 2 types.

1) Unrestricted or Simple Random Sample.

2) Restricted Random Sample.

II) Unrestricted or Simple Random Sample :

The unrestricted or simple random sampling refers to the technique in which each and every item of the population or universe

has an equal and independent chance of being included in the sample. The underlying feature of a random sample is that the personal factor is eliminated in the selection of the sample as the investigator does not exercise his discretion in the choice of items. No factor other than pure chance affects the likelihood of an item being included in or excluded from the sample.

So, this method is also known as the method of chance selection. This method is also called as a probable sample as each item has equal opportunity or probability or chance of being selected. However this method is suitable for a small homogenous population,

This simple or unrestricted random samples are usually obtained by using the following two methods.

- a) Lottery method.
- b) Random numbers method.

a) Lottery method :

The process of drawing a lot among the population or universe is known as lottery method or simple random sampling. In this method, all the items of the population are represented by small chits of paper of same size which are folded in the same manner and mixed together. The required number of samples are picked out from this by a blindfolded person.

For instance, if we have to select 100 samples, now we have to pick out 100 chits of paper to form the required sample size. However this method is very tedious process when the size of the population or the size of the sample to be selected is very large,

1) Random Numbers method:

There are Random Numbers Tables which contain the numbers of items at random to be selected for purpose of sampling certain required items from any given size of population,

The following are the important tables.

- i) Tippet's table of random numbers.
- ii) Kendall and Babington Smith Numbers.
- iii) Fister and Yate's numbers.

It is very simple to select the required random sample with the help of these number tables.

For instance, it is required to select a sample of 100 items from a population of 5000 items. Firstly, we have to allot or number the various items of the population from 1 to 5000. Now, we have to open any page of the Table and select the first 100 numbers which are less than 5000. The items having the allotted numbers will form the required random sample for the purpose. As the randomness of these numbers and tables have been tested several times, it is highly dependable to adopt this method to select the sample from a relatively smaller size of population.

2) Restricted Random Sample :

The unrestricted random samples involves much expenses and time : Moreover the unrestricted random sampling cannot be adopted when the population is relatively larger in size.

So, a restricted random sample is used in order to increase the efficiency of sampling technique. The following are the three methods of restricted random sample.

- i) Stratified Sampling.
- ii) Cluster Sampling.
- iii) Systematic Sampling.

1) Stratified Sampling :

Stratification refers to the process of dividing the entire universe or population into groups or sub universe. When the entire universe or population is divided or subdivided into homogenous groups it is called as stratas and sample is drawn from each stratum at random; These samples drawn from each of the strata are combined together to form a single sample of the entire universe of population.

Under stratified sampling the efficiency of the sampling is increased because when the universe consists of heterogenous items, it is divided into various homogenous groups or strata on the basis of some known characteristics. The characteristics which are normally used for stratification depends on the individual problem under investigation or study. However, in practice, geographical, sociological and economic characteristics are often used, for grouping of the population or universe.

Allocation of Stratified Sampling :

After stratification of the universe or population it is necessary to decide upon the number of items to be drawn from each stratum. The procedure employed in determining the number of items to be drawn from each stratum is called allocation. The allocation of stratified sampling may be proportional or disproportional to the size of the stratum.

In a proportional stratified random sampling plan, the number of items drawn from each stratum is proportional to the size of the strata. On the otherhand if an equal number of units are drawn from each stratum, regardless of the total size of the stratum, then it is known as disproportionate stratified random sampling. In the case of proportionate allocation of sample, the total sample would properly represent all the strata which would in turn eliminate the difference between strata and thus reduces the sampling error.

Thus the stratified random sampling method is suitable for a large heterogenous population. Moreover this method does not consider all the items of the universe as equally important for the purposes of study or consideration.

ii) Cluster Sampling or Multistage Sampling :

The adoption of the simple random sampling and stratified random sampling always needs enormous amount of expenses especially when dealing with large and geographically dispersed population. So in the case of large scale surveys, the cluster or multi stage sampling method is followed. This method involves various procedures to be followed or carried out in several stages. Under this method the population or universe is divided into clusters or large groups which will form the basis for primary sampling units. These clusters may be city, wards, households establishments or several geographical or social units.

After forming these clusters, a few sample clusters will be selected by unrestricted random sampling method. These selected clusters are called as primary sampling units. There may be a number of items in each of the primary sampling units. Now, it may be possible to investigate each and every elementary sampling unit in selected cluster, or it may be possible to draw an unrestricted random sample of elementary sample unit from each selected cluster. It is often found that the clusters formed on a geographical basis are of great practical importance.

Difference between cluster sampling and stratified sampling :

Although the entire universe is divided into several groups as strata and clusters in the case of stratified and cluster sampling methods, there are certain differences between these two methods. In stratified sampling the groups or stratus are divided in such a way that

- i) there is much homogeneity within each group and

ii) there is market difference between various groups or strata.

But in cluster sampling the universe is divided into groups or clusters in such a way that

- i) there is much heterogeneity within each cluster.
- ii) there is only small difference between the clusters.

Thus, it is generally held that a cluster sample is considerably less expensive than unrestricted random sample. It also saves lot of time also. Again lack of complete and upto date list of elementary sampling units makes the task very difficult and sometimes impossible to use unrestricted random sample. Under such situations, it is only the cluster sampling method can be best suited to the situation. However, it is considered that cluster sampling method gives less accurate results compared to other methods of sampling.

iii) Systematic Sampling :

While stratified and cluster sampling techniques involve the division of the universe into groups, the systematic sampling method involves only an ordering of the universe. The or during may be in alphabetical, numerical, geographical and any other basis. After the items in the univers have been ordered every 10th, 20th or 100th items are selected depending upon the size of the universe and size of the sample to be selected. This sampling procedure ensures greater representativeness because the items sampled are spread evenly throughout the population. If the serial number of item selected is assumed to be every Kth item the number K may called as the sampling interval.

$$\text{Sampling interval or } K = \frac{\text{Size of the population}}{\text{size of the universe}}$$

This method is popularly used in those cases where a complete list of ~~information~~ population from which sample is to be drawn is available.

Although systematic sample will be a random for all practical purposes, it is known as quasi-random sample. The main advantage of systematic sampling in its simplicity. An advantage of stratification can also be realised by an appropriate ordering of stratification. However, systematic sampling method cannot be used in all situations,

II. Non-Random or Non-Probability Sampling :

The most important characteristic of the non-probability sampling is that the sampling procedure adopted in this design does not afford any basis for estimating the probability that each element in the population has the opportunity of being included in the sample. In other words, there is no assurance that every element has some specifiable chance of being included in the sample. The important forms of non-probability sampling are.

- i) Accidental sampling
- ii) Quota Sampling
- iii) Purposive or Judgement Sampling.

i) Accidental Sampling :

In this method, the investigator simply contacts and picks up those cases which he come across and thus continuing the process till the total sample reaches a designated size.

For instance, the investigator may take the first 100 persons he meets on any one of the area or streets who are willing to be interviewed or to provide the informations required.

This method of sampling is economical and convenient and can also afford a basis for stimulating in insights and hypothesis. Similarly, the accidental sampling is also useful in those cases of study where too much accuracy is not needed.

ii) Quota Sampling :

It is one of the most commonly used methods of sampling in marketing research, election polls etc. In this method, the total sample population is divided on the basis of known strata in the universe as age, sex, occupation, social class, etc. The quotas may be fixed according to the proportion of the people belonging to different strata in the universe and thus leave the actual selection of the respondents to the investigators.

Thus Quota sampling has three stages of selection.

- a) classification of the population in terms of same characteristics.
- b) determination of the proportion of the population falling into each group or class on the basis of known, assumed or estimated composition of population.
- d) Assigning a quota of respondents to various investigators or interviewers.

However, there is always likely to be a considerable amount of personal bias in the quota sampling method.

iii) Purposive or Judgement Sampling :

In this method, the sample items are selected in accordance with some purposive principles or in accordance with some one's personal judgement. However the chance of inclusion of some item of the population in the sample is very high while others is very low. Similarly, the bias of the investigator can play a very important role and sometimes even destroy the representatives of the sample. But there are cases where purposive sampling can always give better and accurate results.

The purposive sampling is suitable when the universe consists of only a small number of sampling units and in solving every day business problems etc.

Combination of Probability and Non-probability Sampling :

It is possible to combine probability and non probability sampling in one design especially when the sampling is carried out in a series of stages. One or a few stages of sampling can be carried out on the basis of probability principle and other stages may be on the basis of non-probability principle.

SAMPLING TECHNIQUES (CONDT)

SAMPLE SIZE

The most important problem which confronts a researcher at the outset is the size of the sample. If a larger sample than what is required is chosen, it involves both more cost and time. If a small sample is chosen the results obtained will be relatively less accurate. So the size of sample must be optimum in nature. An optimum sample may be defined as that size of sample which fulfills the requirements of effeciency, representativeness, reliability, flexibility. However, the actual size of the sample depends on the following factors.

1) The Nature of Population :

If the composition of the survey population is more homogenous in nature fewer cases will yield a reliable results. On the other hand if the population is more hetrogenous is nature more number of cases may be required to constitute a reliable sample size.

2) Complexity of Tabulation :

The size of the sample also depends upon the number of categories and classes into which the findings are to be grouped and analysed. If these categories are greater in number large size of the sample may be needed to yield reliable statistical results. Sometimes the sample size may look quite adequate for the main tabulations, but the number of sample is likely to vanish very quickly when detailed tabulations are prepared. However the size of sample chosen should be large enough to give adequate and reliable measure of the smallest important categories of data or information.

3) Problems relating to Collection of Data :

The size of the sample must be such that it can be secured with given funds and time.

The volume of data is affected by the length of the questionnaire or schedule, the number of field worker, the concentration of cases in a geographical area, the refusal rate, the losses of cases, the type of sampling method employed and the method of data collection.

4) Type of sampling :

It is generally considered that a smaller sample will be sufficient when stratification is employed in the sampling technique. If the population is more heterogenous, the greater the possible economy of cases through stratification. In other words the stratified sampling requires only fewer cases compared to simple random sample because the sample in each stratum needs to be representative of that stratum and not of the entire univers or survey population.

5) The Mathematics of sample size :

The basic question in determining the size of the sample is how to determine the sample size which will yield the desired degree of precision set up by the researcher for a given study. The researcher must know what kind of statistics on the sample will suffice namely percentages, averages, standard deviation etc for such estimation. It is because different kinds of statistics for a particular degree of precision is provided by different sample sizes. It is only the percentages or averages are the most commonly used statistics. However, before the calculation of the required size of the sample for any given study, it is necessary in practice to secure some basic information about the population or universes. Such information may be obtained through a pilot study, past surveys, experience of the experts etc.

6) Margin of Error or Limit of Accuracy :

The researcher may have to decide about the tolerable limit of error in the estimate of sample compared to the true value that is, margin of error or limits of accuracy. Similarly it is also to be known that how the estimate will fall within the margin of error required. The researcher may tolerate the margin of error to 5% or 2% depending upon the degree of accuracy required in the

study. It should also be noted that the standard error gets smaller as the sample becomes larger in size.)

Mildred Parten has given the following formula for calculating sample size.

$$\text{Sample size} = \left(\frac{S Z}{T} \right)^2$$

Where **S** stands for the preliminary standard deviation of the universe.

Z stands for the number of standard error units.

T stands for the margin of error to be tolerated.

SAMPLING AND NON SAMPLING ERRORS :

In a sample survey, only a small proportion of the entire universe or population is studied and thus inferences are made about the entire universe or population. So there is always likely to be a certain amount of inaccuracy or errors in such inferences. Such errors are known as sampling errors or sampling fluctuations. Such sampling errors are not likely to be there in a census survey.

I. Sampling Error :

The errors which arise in the sample surveys are known as the sampling error. There are two type of sampling errors.

1) Biased errors.

2) Unbiased errors.

II) Biased errors :

These are the errors which arise on account of the bias or prejudices of the person in selecting a particular method of sampling.

For instance, a purposive sampling method may be adopted instead of a simple random sampling method. Consequently some errors are likely to arise in the calculations. Such errors are known as biased sampling errors or cumulative errors or non-compensating errors. Such errors are also likely to increase with an increase in the size of the sample.

2) Unbiased errors :

These are the errors which arise due to chance differences between the members of the population included in the sample and those not included. It is also known as random sampling errors. The random sampling error decreases on an average as the size of the sample increases. Hence the unbiased errors are otherwise called as non-cumulative or compensating error.

The bias in the surveys may arise on account of the faulty process of selection of sample faulty work during the collection of information and faulty method of analysis.

II. Non Sampling Errors :

These errors can occur both in census and sample surveys. It includes the biases, prejudices and other related mistakes which arise in conducting the survey. The non-sampling errors tend to increase with the sample size. The factors responsible for the non-sampling errors include the vague definition of population, vague questionnaire, vague conception regarding the information desired, inaccurate or inappropriate methods of interview, observation or measurement of errors in data processing operations and errors committed during presentation and printing of tabulated results.

ADVANTAGES AND LIMITATIONS OF SAMPLING

ADVANTAGES OF SAMPLING :

The sampling technique is widely used in survey method of data collection. The following are the advantages of Sampling technique.

- 1) When the size of population or universe is very large, sampling technique is best suited for the collection of data as it economises money, time and effort.
- 2) When the lesser percentage of accuracy is sufficient in any study, the sampling technique is much suitable for the collection of information or data through the sample, survey. A higher percentage, of accuracy can be ensured only through census survey.
- 3) The sampling technique enables the investigators to collect the required information from relatively a large size of population or the availability of data as unlimited in character.
- 4) There are certain types of study where census method cannot be adopted at all. For instance in a study relating to the availability of mineral resources in the country, sampling method is to be necessarily following to make an attempt to evaluate its availability below the earth in the country.
- 5) When the items of an universe or population is more homogenous in nature, sampling technique is more feasible and useful.

Limitations of Sampling :

- 1) The conclusions or generalisations derived from a sample survey are always less accurate and liable for more error compared to the conclusions arrived through the census method.
- 2) When the various units of the survey population are not alike and liable to change frequently, the sampling technique will be very hazardous. The conclusions derived from one set of units are not comparable with another set of units which are frequently liable to change in their nature.
- 3) If due care is not taken in conducting a sample survey through a proper selection of sample units, the conclusions will be much misleading and erroneous in nature.

DATA COLLECTION AND PREPARATION.

COLLECTION OF DATA

✓ PRIMARY DATA AND SECONDARY DATA

All research needs adequate and accurate data or information. So the collection of data is the first step in any statistical investigation. There are two types of statistical data, namely 1. The primary data 2. The Secondary data.

The primary data are those data which are collected for the first time. In other words the primary data are original in character. On the other hand the secondary data are those data which have already been collected, tabulated and presented in some form by some one else for some other purpose. While it may be said that primary data are in the form of raw materials to which statistical methods are applied for the purpose of analysis and interpretation, the secondary data are in the form of finished products as they have already been treated statistically in some form or other. However this distinction between primary and secondary data is one of degree only. The data which may be considered to be primary for one agency may be secondary for another agency and vice versa. For example, the data collected during the population census operations are primary to the census department of the Government of India, but they may be considered to be secondary to anybody who makes use of these data for the purpose of research.

The primary data have two important advantages compared to the secondary data. The primary data are :

- 1) truthful and
- 2) purposive.

However the primary data have two disadvantages.

- 1) It takes more time to collect data by the primary method.
- 2) The collection of primary data involves more expenses.

However, it must be noted that while some problems of research require only primary data, others require only secondary data. But most of the researches require both primary and secondary data. So the investigator has to decide at the outset whether he proposes to use primary data or secondary data or both. ✓

SOURCES OR METHODS OF COLLECTING PRIMARY DATA

The important primary sources of collecting the data are through

- 1) Interview
- 2) Use of Telephone
- 3) Observation
- 4) Questionnaire.

Although there are various tools or methods for the collection of primary data, they are not mutually exclusive and independent of one another. The choice of any one method depends on the following factors.

1. The nature, objectives and scope of the enquiry.
2. The availability of money or finance.

3. The availability of time.

4. The degree of accuracy required in the investigation.

I. INTERVIEW

The interview method of collecting the primary data is the most important and all pervasive tool in all problems of research. Moreover this method is best suited to the problems of developing countries like India depending upon the nature of the problems and the environment from which data are to be collected. The interview method is like verbal method of securing data mostly through filling up the schedule by the interviewer in a face to face situation.

The personal interview may be defined as an effective informal verbal and non verbal conversation initiated for specific purpose and focussed on certain planned content areas. The main difference between the interview and the questionnaire method is that the interview involves presentation of oral-verbal stimuli and reply in terms of oral-verbal response. But the questionnaire method involves presentation of written-verbal stimuli and return of written-verbal response. In other words the interviewing is an interactional process. It is a mutual view of each other. Interviewing is not necessarily a simple two way conversation between an interrogator and informant, but gestures, glances, facial responses, pauses are also revealing subtle feelings.

TYPES OF INTERVIEW :

The Interview may be classified in various ways.

- 1) On the basis of their functions, the interview may be classified into diagnostic interview, research interview and sample interview.

- 2) On the basis of number of persons participating in the interview it may be classified into group or individual interview.
- 3) On the basis of the length of contact, the interview may be classified into short interview or long interview.
- 4) On the basis of the nature of approach, the interview may be classified into structured or directive interview and unstructured or non-directive interview.

FEATURES OF SUCCESSFUL INTERVIEWING :

The successful interviewing has two facets - the personnel and training. The personnel aspect lies in the selection of the investigators. The personal qualities of the investigator have a particular importance is the first essential step in interviewing, namely, building rapport through ensuring the cooperation of the respondents. The general aspect of interviewing has a psychological as well as practical side. As the interview is essentially an interpersonal relationship, a knowledge of the psychological dimensions behind this relationship is essential. The deficiencies, varying motivations, and diverse perceptions of the respondents have to be understood and neutralised. Thus the success of the interview depends on the training of the interviewer. A successful interviewer should try to gain and deserve the confidence of the respondents and thus establish pleasant associations with them.

TYPES OF RESPONDENTS OR INTERVIEWERS :

The technique of interviews varies according to the type of persons involved. There are three types of interviewers.

- 1) The man in a position of authority called as the potentate.
- 2) The one with special knowledge, that is, the experts.
- 3) The man in the street, that is, masses.

It is always considered that the potentate helps with permission, the expert with his specialised knowledge and the masses with facts and figures.

ADVANTAGES OF INTERVIEWING :

The interview as a tool of collecting the primary data has the following advantages.

1) **Higher percentage of returns :**
The personal interviews always yield a higher percentage of returns from the respondents compared to the questionnaire.

2) **More Reliable :**

The informations secured through personal interviews are likely to be more realible than the informations collected through other methods.

3) **Flexible tool :**

The interview is a flexible tool. The questions can be interpreted, repharsed or repeated in order to elicit proper informations from the respondents. Moreover the interviewer can put supplementary questions or seek supplementary informations wherever necessary.

4) **Highly adaptable :**

The language of the interview can be adapted according to the ability or educational status of the person concern'd.

LIMITATIONS OF INTERVIEWING :

There are certain limitations in interviewing.

1) There are certain limitations associated with the technique itself such as time space and expenses.

- 2) Some limitations are associated with the interviewers such as personal bias, his perceptions, method of recording, follow up questions etc.
- 3) There are some limitations associated with respondents such as the unwillingness or their inability to provide certain informations. Similarly, there are memory bias and reporting bias.

However, it must be noted that many limitations of the interview as a method for collecting primary data are not inherent in its general technique or process, but mainly due to faulty perceptions and ill defined goals of particular interviewers,

II. TELEPHONE INTERVIEWING

The popular communication device like telephone has been increasingly used for conducting personal interviews. It is one of the least cost methods of obtaining primary informations. This is widely adopted by the business houses, advertising firms and radio stations. This system is widely followed by American Advertising and Television firms. The chief advantage of the method is the low cost involved in carrying out the survey. This method is very useful to interview the respondents living in very remote areas and thus helps to carry out the study over a wide geographical area with lesser cost and time. Moreover the interview bias is also less in the case of such telephone interview due to the avoidance of face to face contact between the interviewer and the respondents. Again, it is also possible to call the respondents back again if they are not readily available at first and thus the success rate of response is much higher.

However there are some limitations in the telephone interviewing. This method can be of very limited use as it is possible to

- 1) It is possible only when there is 7/
- 2) so it is not a representative of the whole universe.

conduct the survey only among the telephone subscribers who may not be the representative of the entire survey population. Moreover, only a relatively small amount of informations can be obtained in each call. Again, in telephone interviewing it is also not possible to use the visual aids like maps, illustrations, etc. However, the telephone interviewing has been widely used for obtaining the reactions of the consumers, wholesalers or retailers, project evaluation, or opinions about any particular trend or phenomena in the country

III. OBSERVATION

The important source of informations to any scientific investigation or research is the experiences derived from observations and experiments. So observation is one of the important methods of acquiring knowledge in social and physical sciences. However it must be noted that while observation is a passive act, the experiments are the active facets. But in social sciences, the observation plays a more important role than experiments.

Observation refers to the recording of data as they come to the notice of the investigators. In other words observation means the careful and systematic watching of facts as they occur in course of nature. Thus observation consists in collecting facts with the direct knowledge of the investigators and again observation is not merely seeing things but it is seeing with a purpose.

COMPONENTS OR PROCESS OF OBSERVATION :

Observation has three component namely

1. Sensation
2. Attention
3. Perception.

1. Sensation :

It is the first step in observation which is gained through the sense organs. The reliability and fullness of the sensory reactions to the situation depend on the keeness of the sensory organs and physical fitness of the investigator. Although, several apparatus are available for recording the impressions, it is the personality of the observer is more responsible for accurate observations.

2. Attention :

It is the ability of the investigator to pursue the subject of study under concentration. However concentration is largely a matter of willpower which depends on adequate training, experience etc.

3. Perception :

It is the interpretations of the sensory reports. When the sensations merely reports the facts as observed, it is only perception enables the mind to recognise the facts by grouping and identifying sensations and drawing upon past experiences, imaginations and thought.

Objectives of Observation :

The observation is most useful in collecting facts rather than finally interpreting them. In this process observation serves distinctive purposes.

- 1) studying collective behaviour and complex social situations.
- 2) following up of individual units composing the situation.
- 3) understanding the whole and the parts in their interrelation.
- 4) getting the out of the way details of the situations.

To serve the above purposes, the observation has to be accurate for which the researcher a background of knowledge and experience.

TYPES OR KINDS OF OBSERVATION :

There are various types of observation.

1) ^{Controlled} ^{uncontrolled} Controlled and uncontrolled Observation :

The controlled observation is mainly the characteristic of physical Sciences. In this case the mechanical aids securing accurate data are used. The conditions of observation are standardised and attempt are made to get a representative sample. On the other hand, the uncontrolled observation is mainly characterised by the absence of the use of any precise instruments for measuring and recording of facts and also to check their accuracy. In other words, in uncontrolled observation, the mechanical aids are not used and the data are collected without standardising procedure and without resorting to a random sample.

2) Direct or participant and Indirect or Non participant Observation:

In participant observation, the investigator will become a part of the group and thus penetrate into the thought, emotions and actions of the observed group. It will enable the observer to gain reapproachment and opportunities for following the situation more closely, correctly and comprehensively. But in the case of non-participant observation, the observer keeps himself outside the situation he is studying. Moreover participation is not always possible in all situations.

RELIABILITY AND SUCCESS OF OBSERVATION :

The accurate and more reliable objective observations are possible only when the following conditions are satisfied.

- 1) The observed problem must be formulated very clearly and precisely. This will save time by leading the investigator to concentrate on relevant facts only.
- 2) The observer must develop a free and open mind and thus avoid the temptations to formulate an opinion on the basis of the first few cases he comes across.
- 3) As the facts observed are always interrelated, only vital elements should be considered and thus irrelevant data should be excluded.

However the reliability and success of observation depends on the following 3 factors.

- 1) The technique and tools used
- 2) The kind of situation observed
- 3) The quality of the observer.

Model Questions :

- 1) Discuss the advantages and disadvantages of Interview as a method of data collection.
- 2) What are the various types of observation? Explain its limitations.

COLLECTION OF DATA (CONTD.)

QUESTIONNAIRE AND SCHEDULE

A Questionnaire or a Schedule is a device that is most frequently used in gathering primary data or information by using the survey technique.

QUESTIONNAIRE : *Questionnaire is a form which seeks no questions by which the respondent fills in himself.*

The term questionnaire refers to a device for securing answers to questions by using a form which the respondent fills in himself.

SCHEDULE :

It is the name usually applied to a set of questions which are asked and filled in by the interviewer in a face to face situation with another person.

Thus the two forms, namely the questionnaire and the schedule have much in common particularly the fact that in both cases the wording of the questions is the same for all respondents. But, a questionnaire differs from the schedule in one important aspect. The questionnaire is sent by post or delivered to the respondents in some way and it is filled up by the respondent without the presence of the investigator or enumerator. But a schedule is always filled up by the enumerators who normally interpret the questions wherever necessary.

TYPES OF SCHEDULE OR QUESTIONNAIRE :

According to the uses, the schedules may be classified into four groups.

1) Observation Schedule :

It is used for recording observations. They offer an opportunity for uniform classification in recording the activities and social situations of groups or persons.

2) Evaluation Schedule :

It is used in sociological or psychological research. Such schedules are useful in those cases where the attitude or opinions are to be studied or measured.

3) Document Schedule :

It is used for recording data obtained froms, documents, case histories and other materials.

4) Interview Schedule :

It is used for collecting data by interviewing the informants. It consists of standard questions which are asked by the interviewer and thus the blank tables are to be filled up by them after getting the informations from the respondents.

A schedule or a questionnaire may also be classified as follows.

1) Structured or Standardised Schedule.

2) Unstructured or Non-Standardised Schedule.

1. Structured or Standardised Schedule :

It consists of definite, concrete and preordained questions. They are prepared well in advance and not constructed on the spot during the questioning period. The supplementary or additional questions may be used only when need arises to clarify vague or inadequate replies by the informants or when more details are needed. The reason for the standardisation is to ensure that all the respondents are replying to the same set of questions.

2. Unstructured or non standardised Schedule :

Specific area to be covered within which no one made
It refers to the interview guides which contain the specific areas of subject matter to be covered during the interview. The interviewer is free to arrange of course within certain limits the form and timing of enquiries. It is designed to obtain view points, opinions, attitudes and to show relationship and inter-connections between data. No checklists with predetermined responses are provided. Thus, the flexibility is the chief advantage of the unstructured questionnaire or schedule.

CONTENTS OF QUESTIONNAIRE :

The informations sought through the questionnaire or Schedule may be classified as follows.

1) Identifying information or Introductory part :

In this part, the details regarding the name of the survey, the address of the surveyor, serial number of the case, place of interview, date and time of the interview, address of the cases, etc are given in detail.

2) Social background and Factual Information :

In this part, the details regarding the age, marital status, education, religion, political preference, family size and composition, occupation, employment details, family income, socio-economic status, are collected.

3) Subject matter Information or Main Schedule or Questionnaire :

advice
In this part, the informations may be asked through questions on the facts which they understand or remembers them. Another approach is through seeking advice. The informants are usually flattered by the fact that his advice is considered more important. There is another approach which the opinion pollers use is the exploratory questions. In this, the informant is given a sufficient background or information about the survey topic to enable him to make a suitable judgement.

DESIGNING THE QUESTIONNAIRE OF SCHEDULE :

The external aspects of a questionnaire is known as form or structure. If the structure is unattractive the chances of its success are very limited. So the physical form of the questionnaire must be given adequate importance.

1) Physical form of Questionnaire :

i) Size :

The size of the questionnaire depends upon on the scope of the survey and the number of items to be included. If the schedules

are small, it can be carried easily in pockets and brought out only after the respondent has answered to the call. If the questions can be put on handy cards, sorting, counting, filing, checking etc, can be done easily.

ii) Length :

As the respondents do not like to spend a long time in filling up the schedule or questionnaire, the length of the schedule should be quite reasonable that as to complete the job in less than half-an hour. *ie it should be*

(ii) Use one side of paper :

It is desirable to use only one side of the form, the reverse being left blanks for special remarks. When both sides are used iling and sorting will be very difficult. ✓

iv) Margin and Spacing :

There must be proper margin and spacing among various questions. In between the questions, there must be titles, subtitle and columus for noting the responses.

v) Use of pictures :

The charts, diagrams, and pictorial materials may be used in all questionnaire especially in mailed questionnaires to sustain and recreate interest on the part of the respondents.

vi) Quality and Colour of the paper :

The paper used for printing the questionnaire or schedule should be durable so as to enable to keep them in record for long time

Similarly, it has been found that in the case of mailed questionnaires, the colour of the paper must be able to attract the respondents attention. In the case of schedules, the white and light coloured schedules are preferable from the collection point of view. In certain marketing studies, the yellow coloured paper was found to have the highest percentage of returns of questionnaires.

vii) Arrangement or Grouping of Items :

The questions which belong to the same category should be arranged together. When the question is dependent on the answer to the preceding question, it should be given a subordinate place.

2) Choice or Type of questions :

The questions in the schedule or questionnaire may be classified as follows.

i) Specific information questions :

These questions require specific answers to the questions. For example, How many units of output sold in the market?

i) Open type question :

These questions do not require specific answers. The informants can give their reply in their own words. For example, what is your opinion about the industrial policy of the Government?

iii) Alternative type questions :

These questions have to be answered in a word like 'yes or no' or 'For and Against' or 'True or False'. If the informants do not take sides, he can say 'Don't know which will be marked D.K.

iv) Multiple Choice Questions :

In this case, various alternative answers to the question are given and the respondents have to choose the right answer among them by marking against the answer appropriate to them.

ADVANTAGES OF THE QUESTIONNAIRE TECHNIQUES :

i) Economical :

The mailed questionnaire is popularly used when the geographical area covering the survey is very wide and the respondents are scattered over a very vast area. So questionnaire method is more economical in terms of money, time and energy.

ii) Anonymity :

There are certain studies which requires anonymity about the respondents. For example, the studies relating to marital relations, dreams etc. Moreover it is expected that the respondents will feel very free to give their opinions as they do not require to indicate their names on the questionnaires.

ii) Uniformity :

As the questionnaire is an impersonal technique, the uniformity can be provided by standardised wordings of questions. Moreover, this method places less pressure on the subject for immediate response and provides more time to the respondents for answering the questions.

DISADVANTAGES OR LIMITATIONS OF THE QUESTIONNAIRE

1) Limited in Use :

The questionnaire method of collection of data can be used only among the respondents who are well educated and ready to cooperate with the investigators. In other words, in the case of such studies relating to the common people, questionnaire method will be very limited in use and application.

2) Lower percentage of returns :

In the case of mailed questionnaires, the proportion of returns of questionnaires with reply is very low.

3) Chances for misinterpretations :

modi
In the case of mailed questionnaires, there are chances for the misinterpretation of questions, and replies not best suited for the purpose. So appropriate corrections cannot be done through repeating questions or by offering clarifications to the respondents. *clarification cannot*

PRETESTING AND PILOT STUDY :

Pretesting is the process of an advance testing of the study design after the schedule or questionnaire has been prepared. It is very much useful and necessary to pretest the schedule or questionnaire because it provides a test for the clarity of questions and correctness of the interpretations put upon them by the respondents. Moreover, pretesting provides the possibility for the discovery of new aspects of the problem studied which are not anticipated in the planning stage.

PILOT STUDY :

A pilot study is a preliminary study conducted on a limited scale before the original studies are carried out to gain some primary information. Such preliminary survey of study of the universe enables to know the nature and various other aspects of the problem. The pilot study is undertaken on a small sample without formulating any hypothesis. However, the size and design of the pilot study is a matter of convenience time and money. After the pilot study is over it is possible for the researcher to know whether the main study is still worth as planned.

ADVANTAGES OF PILOT STUDY :

- 1) The pilot study helps in the selection of the respondents. It also exposes the inadequacies in the draft questionnaire. It also helps to know the non-response rate, reasons for it, desirable time for interviewing etc. *Schedule, Accuracy, Time / money*
- 2) The pilot study provides the necessary training and motivations for the investigators to carryout their planned job. *Method*
- 3) The pilot study provides an opportunity for the investigator to learn about the local culture and builds up self confidence for creating a rapport with the respondents. In other words, the pilot study provides a trial rehearsal to test the work of the interviewers. *not a pilot*

(4) The pilot study helps to indentify the tools and equipments needed for the survey. The mode of transport and the tools and equipments needed for carrying the main survey have to be decided only on the basis of the experiences gained during the pilot study.

(5) The pilot study helps to estimate the time and cost for completing the work successfully and also facilitates to effect economy wherever possible.)

SECONDARY DATA :

(The secondary data are those data or informations collected from the secondary sources. These secondary sources may be both internal as well as external in character. The internal source refers to the informations that already exists within the company or unit studied. For example, the records of sales, budget, advertising expenses, previous marketing research studies and similar such reports. The external source may consist of both private and public documents. These documents may be both published and unpublished in nature. The external data refers to informations which is collected by a source external to the firm or unit. Such external source consists of Government publications, business reference sources, and commercial agencies. The private documents may consists of life history, Diaries, Letters and Memoirs. Similarly the public documents may consist of the documents published by the journals, magazines, Newspapers and other sources.)

ADVANTAGES OF SECONDARY DATA:

The secondary data has the following advantages.

1) The secondary data or information provides an insight into the total situation studied. In the course of exploring the available secondary sources, many unexpected informations may come to light and thus may contribute significantly for the problem studied.

2) The secondary source may help the researcher to formulate hypothesis. The availability of many new informations through the secondary sources may enable to formulate several other hypotheses. Such secondary informations may also keep to test such hypotheses.

3) The secondary sources may provide several supplementary informations needed for the study.

DISADVANTAGES OF SECONDARY DATA:

1) The secondary data are originally collected for a different specific purpose and hence they may not be well-suited to the problem presently studied.

2) The secondary data are the data collected in the past and thus they may not be current and upto date in nature.

3) The secondary data collected in the past would have been aggregated in some form and such aggregation may not be useful for a particular unit of study.

DATA PREPARATION

~~DATA~~ Data Collection & Preparation

Data preparation is the act of manipulating raw data into a form that can readily and accurately be analysed, e.g. for business purposes. Data preparation is the **first step** in data analysis and interpretation.

Classification of data

Meaning

Classification is the process of arranging the related facts into homogeneous groups according to the resemblances and similarities. The process of division of data, into homogeneous groups according to their characteristics, is known as **Classification**.

Definition :

"The process of grouping a large number of individual facts or **observations** on the basis of similarity among the items, is called **classification**" - Stockton and Clark.

According to Horace Secrist, "Classification is the process of arranging data into sequences and groups according to the common characteristics or separating them into different but related parts".

Basis of classification or Modes of Classification

The classification of data depends on the purpose or objectives of the enquiry. Some common modes of classification are given below ;

- 1) Geographical Classification.
- 2) Chronological Classification.
- 3) Qualitative Classification.
- 4) Quantitative Classification.

1) **Geographical Classification :**

Data are classified on the basis of geographical or locational differences between various items. e.g: **Production of Raw Cot-**

ton in India may be classified on the basis of State-wise or District-wise. It is also known as **Spatial Classification**.

2) **Chronological Classification :**

When statistical data is classified according to the time of its occurrence, the type of classification is called as **Chronological Classification**. e.g: Figures of population, production, sales etc.. can be classified on the basis of time.

3) **Qualitative Classification :**

In this method, data are classified on the basis of some attributes or quality such as sex, colour, religion etc.. Attributes can not be measured but can be found out whether it is present or absent. This classification is again subdivided into two groups.

a) **Simple or Two fold way of Classification :**

When only one attribute is studied two classes are to be formed, one possessing the attribute and the other not possessing the attribute. This type of classifications is known as simple or Two fold classification.

b) **Manifold Classification :**

When two or more attributes are studied then two or more classes are to be formed. This type of classification is known as Manifold classification.

4) **Quantitative Classification :**

If the data are classified on the basis of phenomenon which is capable of quantitative measurement like age, height, weight, production etc.. it is termed as **Quantitative Classification**. It is also known as **Classification by Variables**. Variable is a quantitative phenomenon under study. Variable refers to any measurable quantity which can assume a range of numerical value within certain limits.

e.g: Price, marks, wages, etc.. A variable may be either Discrete or Continuous variable.

Types of Distribution

There are four types of distribution.

1. Frequency distribution
2. Percentage distribution
3. Cumulative distribution
4. Statistical distribution

1. Frequency distribution

Frequency distribution presents the frequency of occurrences of certain categories. This distribution appears in two forms.

i) Ungrouped

In this, collected data are not grouped, into categories. **Example** marks obtained by students such as, 40,48,50,55,60 etc. will be presented separately in the distribution

ii) Grouped data

In this data are grouped in to categories. **Example** Marks may be classified as 0-10, 10-20,20,30,30-40,40-50,50-60 etc.

2. Percentage Distribution

In this distribution, frequencies are given in the form of percentages.

3. Cumulative distribution

This distribution tells how often the value of the random variable is less than or equal to a particular reference value.

4) Statistical data distribution

Under this type, some measure of average is found out of a sample of respondents. The researcher has to select the suitable average for the purpose of his study.

Frequency

The number of observations against the groups or variable is called **frequency**. That is, it refers to the number of occurrence of the value. **Example** : The marks of 5 students are 60, 61, 60, 62, 65

Now the frequencies for marks 60 is two
 Now the frequencies for marks 61 is one
 Now the frequencies for marks 62 is one
 Now the frequencies for marks 65 is one

Numerical data are further classified into three series

1. Individual series

In this series, the items are listed individually, separately one by one either in ascending order or descending order. **Example** Income of 6 families are given below.

| | | | | | | |
|--------------|--------|--------|--------|--------|------|-------|
| Family : | 1 | 2 | 3 | 4 | 5 | 6 |
| Income : Rs. | 50,000 | 20,000 | 40,000 | 60,000 | 5000 | 28000 |

2. Discrete series

Discrete Variable is one where the individual values differ from each other by definite amounts. **e.g: children per family, income of family, house in a city**

| | | | | | | | |
|-------------------|---|----|-----|----|----|----|----|
| No. of Children : | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| No. of Families : | 6 | 80 | 180 | 90 | 50 | 60 | 20 |

Series which can be represented by a discrete variable are called

3. Continuous series

It is one which can be taken any intermediary value between the smallest and the largest value in distribution. **e.g: height, marks, income etc..** Continuous data are obtained through measurements.

| | | | | | |
|------------------|-------|-------|-------|-------|-------|
| Weight (Kgs) : | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 |
| No. of persons : | 10 | 20 | 50 | 40 | 10 |

Series which can be represented by a continuous variable are called as **Continuous Series.**

Continuous series may be formed according to the class interval in two ways.

- a) Exclusive method

b) Inclusive method

a) **Exclusive method**

When the class intervals are so fixed that the upper limit of one class is the lower limit of the next class is known as the **exclusive method of classification**. e.g: 400-500, 500-600 It ensures continuity of data.

b) **Inclusive method**

In this method, the upper limit of one class is included in that class itself. e.g: **400-499, 500-599**. It is necessary to make an adjustment and get the real limits of the classes in the inclusive method.

Open end Classes

In this, class interval may or may not be equal and the lower limit the first class and upper limit of the last class limits are not given. This frequency distribution is known as an **open end distribution**.

e.g : **Below 50, 100-200, 200-350, 350-500, Above 500**

Important points to be considered when classification of data is made.

1. **Class limits :**

The smallest and the largest possible measurements in each class are known as Class Limits. **For example**, 20-30, the lowest value is 20 and the highest value is 30. The two boundaries of a class are known as the lower limit and upper limit of the class.

2. **Class intervals :**

The difference between the upper limit and lower limit of a class limit is known as class interval. It is also known as **common interval**. **For example**, In the class limit 20-30, the the class interval is 10.

3. **Class Frequency :**

The number of observations corresponding to a particular class is known as the frequency of that class or the class frequency. If all the frequencies are added in a frequency distribution, then the sum is known as the total number of frequencies.

below ;

- | | |
|----------------------|-----------------------|
| 1. Table Number | 2. Title of the table |
| 3. Caption | 4. Stub |
| 5. Body of the table | 6. Head Note |
| 7. Foot Note | |

Data processing

After the collection of data, the next step is to arrange the data for processing and analysis of the data. Data processing consists of editing, coding, categorisation and tabulation.

Data processing is an intermediary stage between collection of data and their analysis and interpretation.

Data processing means any operation performed on the data such as collection, use, management or disclosure, etc;.. It involves various manipulations necessary for preparing the data for analysis. Data processing is like the back stage of a theater. Data processing includes identification of variables, hypothetical relationship, if any, among the variables and tentative research hypothesis.

Steps in Data processing :

Data processing involves the following steps.

1. Identifying the type of information
2. Editing the data
3. Coding of data
4. Classifying and tabulation.

1) Identifying the type of information

After the collection of information, the information is identified whether they are quantitative and qualitative. All the qualitative information is to be converted into quantitative information.

2) Editing the data

Editing is the process of examining the data collected in questionnaires / schedules to detect errors and omissions and to see that they are corrected and the schedules prepared for tabulation. It is the activity

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aimed at detecting and correcting errors in data. It is the process of detecting and correcting of errors and omissions. Editing is concerned with removal of redundant data, filling of missing data, completeness of data substance and reliability of data.

Editing is mainly done to check

- i) Completeness
- ii) Accuracy and
- iii) Uniformity

i) Completeness

The information collected are scrutinised whether all the questions in a questionnaire or schedule are answered. In case of minor omissions, the researcher or editor can fill it up based on the available data. If the missing information is of vital importance, then the respondents are to be contacted again.

ii) Accuracy

A random check may be helpful to verify the accuracy of data. Like this, consistency in responses are to be ascertained.

iii) Uniformity

Editing is done to verify the uniformity of data.

Types of Editing

Editing type includes

- i) Validation edits
- ii) Logical edit
- iii) Consistency edit
- iv) Range edits
- v) Variance edits and
- vi) Micro editing and macro editing

3) Coding of data

Coding involves assigning numbers or other symbols to answers so that the responses can be grouped into a limited number of categories. Coding is translating answers into numerical values or assigning numbers

to the various categories of a variable to be used in data analysis. Coding is the process by which data or responses are organised into classes / categories and numerals or other symbols are given to each item according to the class in which it falls. Coding is performed to assign a predetermined meaning to the data captured.

Definition of Data Coding

According to **Lockyer, Sharon**, Coding is a systematic way in which to condense extensive data sets into smaller analysable units through the creation of categories and concepts derived from the data”

Importance of coding

- 1) Coding helps to make analysis and interpretation of data.
- 2) For qualitative studies, coding can help the researcher to derive a general theory.
- 3) Coding helps to analyse the data very easily.
- 4) Coding facilitates the organisation, retrieval and interpretation of data and lead to conclusions on the basis of the interpretation.

Coding of data must be

- i) appropriate to the research problem or purpose.
- ii) exhaustive
- iii) mutually exclusive
- iv) derived from one classification dimension.

Differences between Editing of Data and coding of Data

| Editing of data | Coding of data |
|--|--|
| 1. It is the process of errors elimination. | It is the process of assigning numbers or symbols. |
| 2. Editing is post survey work | Coding can be done before survey work. |
| 3. It helps to check accuracy and consistency | It helps to process data |
| 4. Editing is done at field survey or post survey stage. | Coding can be done at any time. |

CHAPTER 5

INTERPRETATION AND REPORT WRITING

Interpretation of data

Analysis and interpretation are the central steps in the research process.

After the process of classification, and comparison of different data for different periods, the interpreter may give his own conclusion. The process of deriving opinion from the analysis of financial statements is known as **interpretation**. Interpretation refers to the task of drawing inferences from the collected facts after an analytical and or experimental study.

Example:

Current assets and current liabilities are compared and then short term solvency of the business is derived from the comparison.

Interpretation and analysis are closely connected because interpretation is impossible without analysis and without interpretation, analysis is useless. Analysis is not complete without interpretation and interpretation can not proceed without analysis. Hence, interpretation requires analysis. Both are interdependent.

Interpretation refers to the task of drawing inferences from the collected facts after an analysis and / or experimental study. Interpretation can be conceived of as a part of analysis. Interpretation is the process of making sense of numerical data that has been collected, analyzed, and presented. It is the task of interpretation to find out a link or a position of the study in the whole analytical frame work.

Definition:

In the words of **Jahada and Cook**, Scientific interpretation seeks for relationship between the data of a study and between the study findings and other scientific knowledge"

Interpretation calls for a critical examination of the results on one's analysis in the light of all the limitations of his data gathering.

Features:

Following are the features of interpretation.

- i) It is a search for broader meaning of research findings.
- ii) Interpretation is concerned with relationships within collected data, partially overlapping analysis.
- iii) It is the device through which the factors that seem to explain what has been observed by the researcher in the course of the study can be better understood.
- iv) Interpretation provides a theoretical conception which can serve as a guide for further research.

Essentials for interpretation

The object of interpretation and drawing inferences from the data may be possible only when the conditions are fulfilled.

1. Accurate Data

Interpretation is possible only when the available data are accurate and reliable. Accurate and reliable data help to arrive a true and consistent conclusion. On the other hand, if the available data are not accurate and reliable, then the researcher can not derive valid and consistent conclusion.

2. Sufficient Data

This is the another important essentials of valid interpretation. There must be sufficient data to derive the objective of interpretation. If there are insufficient data, then the objective of interpretation may not be achieved. That is, the interpretation may fail to yield the desired result and also it may result biased or unrepresentative conclusion.

3. Proper type of classification and Tabulation

Collected data must be properly classified and tabulated. Then only it is possible to predict the estimation and to derive judgements.

Otherwise, it is not possible to get consistent result by way of interpretation.

4) Absence of heterogeneous data

To get a uniform and accurate result by way of interpretation, the data must be homogeneous. On the other hand, if the available data are heterogeneous, then the interpretation may not yield the desired results. Therefore, "It is suggested to all the investigators to base their calculations on homogeneous data alone".

5) Possibilities of statistical treatment

Every data or information is not suited to statistical treatment. Statistical treatment applied to qualitative nature cannot be applied to quantitative nature. Therefore, the availability of data must be conducive to statistical treatment. The interpretation must give an accurate and reliable opinion to the reader.

6) Consistency of information

Inconsistent and inaccurate data may yield inaccurate and unreliable results. Therefore, consistent and accurate information or data must be interpreted. So that, accurate and stable results may be obtained. Therefore, consistent and reliable data must be used for statistical treatment.

To get better and reliable conclusions, the above essentials must be considered before interpreting the results.

Forms of interpretation

Data may be interpreted in various forms. It depends on the size, nature of data and the need for its interpretation. Important forms or basis of interpretation are given below.

1. Relationship
2. Proportion
3. Percentages
4. Average or other means of comparison

1) Relationship

One of the fundamental basis of interpretation is to find out the relationship between or among variables. It can be, possible with the help of comparative analysis. Comparative statements refer to the process of comparison of financial statements of different periods of a concern or comparison of financial statements of different concerns for the purpose of making decisions. In these statements figures for **two or more periods** are placed side by side to facilitate comparison. Comparative statements provide information to assess the direction of the change in the activities of the business.

Example: Comparison of Balance sheets of two years or profit and loss account of two years is known as comparative statements.

Comparative analysis may be in form of

- i) Comparative Income Statements
- ii) Comparative Balance Sheet

Common size statement is a statement which is prepared in order to find out the percentage of each item of a financial statement to the total. The total assets or total income are taken as 100. That is, in the income statement the sale figure is assumed to be 100 and all figures are expressed as a percentage of this total. Common size statements are also known as **component percentage or 100 per cent statements**. Common size statements are prepared for different periods or different firms. Common size statements are shown in analytical percentage.

Common size statements are

- i) Common size Income Statements
- ii) Common size Balance Sheet

Interpretation may be complete only when there is true and proper relationships amongst different aspects are established.

2) Proportion

Proportion is an another form of interpretation. Proportion form

of interpretation is used only when there are too much variable is to be studied. The proportion between the two variables may be compared to derive conclusion or opinion. **Example** Proportion of rainfall may be compared with proportion of agriculture out put.

5.5 Interpretation and report writing

3. Percentages

Percentage is another form of interpretation of data. The expression of data in terms of percentages is one of the simplest statistical devices used in the interpretation of business and economic statistics. These are very useful only for the purpose of aiding comparison. Percentage represents the number of parts of 100. These should not be used to calculate when the absolute numbers are small.

If the object of interpretation is to determine the nature and extent of approximations for a particular objective, the percentage form of interpretation may be used.

4) Averages or other measures of comparison

To interpret data, methods of averages or other measures of comparisons are used. Averages or other measures of comparisons are considered to be desirable and essential and integral part of interpretation. Averages or other measures of comparisons may be used if a long statistical table is to be used and analysed.

Techniques of Interpretation

Interpretation requires great skill and dexterity. It is an art that one learns through practice and experience.

Steps involved

i) A Researcher must give reasonable explanation on the relation and the researcher must interpret relationship in terms of the underlying process. This is the technique of how generalisation should be done and concept be formulated.

ii) Extraneous information must be considered while interpreting the final results.

- iii) It is advisable to get frank and honest opinion of experts.
- iv) Before generalisation all relevant factors must be considered.

Precautions in interpretation

An interpreter must make satisfactory interpretation. But this is not possible due to the happening of errors. So an interpreter must be careful while making interpretation. Following are the most common errors of interpretation may occur and these must be avoided as far as possible.

1) Failure to see the problem in proper perspective

The Researcher must understand the Researcher problem in a correct sense. If not, this type of problem may arise.

2) Failure to appreciate the relevance of various elements.

The investigators may fail to see the relevance of the various elements of the situation due to an inadequate grasp of the problem, too rigid a mind set or even a lack of imagination. This may lead to incorrect or wrong conclusion or wrong out comes.

3) Ignoring selective factors

During investigation, if selective group is made, the subject of the study or where a selective factor is operation on the situation studies, the researcher is likely to reach unwarranted conclusions if the researcher ignores the selective factors.

4) Misinterpretation due to unstudied factors

A given result is composed of many factors, it is not produced simply by a single factors. The factors which condition any result are innumerable. If any of the factors is not considered, then proper conclusion may not be drawn. This may lead to error in interpretation.

5) Difficulties of interpretative evaluation

Proper interpretation depends upon proper evaluation of facts. Factual interpretation and personal interpretation should be kept apart in a research report. If not errors may occur.

interpretation and report writing

Points to be considered while interpreting data

ing points.

While interpreting data, a researcher should consider the follow-

- 1) The Researcher must satisfy himself that
 - (a) the data are appropriate, trust worthy and adequate
 - (b) the data reflect good homogeneity and
 - (c) proper statistical analysis has been applied
- 2) The Researcher must cautious about the errors that may arise in the process of interpretation.
- 3) The researcher must use correct statistical measures to draw inferences.
- 4) Interpretation must be used as a special aspects of analysis.
- 5) The Researcher has to identify the factors which were not known initially. Generalisation should be made to the point.
- 6) There should be constant interaction between initial hypothesis, empirical observation and theoretical conceptions.

Conclusion and generalisations.

Research is conducted in order to

- i) determine the status of phenomena, past and present.
- ii) ascertain the nature, composition, and processes that characterise phenomena.
- iii) trace growth change and development history and
- iv) study cause and effect relationships.

Each generalisation must agree with the facts revealed by the investigation. The Researcher has to check his generalisation with the generalisation of other investigators or researchers.

Methods of generalisation

There are two methods of generalisation used. They are,

- I Logical method
- II Statistical method

STRUCTURE OF RESEARCH REPORT

RESEARCH REPORTING—TYPES AND CONTENT OF THE REPORT.

Today, there is an increasing tendency to give more importance for the submission of written work as a part of normal course requirements and for the assessment of student, particularly at the tertiary level education. At many colleges and universities, students enroll for a higher-degree such as (post-graduate course or M.Phil. they are required to submit a thesis or dissertation; as evidence of independent study. Hence, it is important, that they have to be well written. Many students need guidance about writing assignments.

This lesson relates to the various types of research report and the content of the report.

Role of the Report :

The research task is not completed unless the report has been well-written. In designing the format of research reporting, a lot of skills is needed. Communication of the results become part of the general store of knowledge. The successful report breathes life into the statistical and logical findings. The research report serves *three main functions*.

- i) It is the means whereby the data analyses and findings are placed in an organised and permanent form. If it is the
- ii) ~~report~~ systematic record of the research, then it will serve as an essential reference for future research along related lines.

The planning, drafting and documentation differ between different types of report. a) Communicative accuracy and b) Clarity are the two essential attributes needed for all the types of report. Communicative accuracy depends not only on the reader's interpretations of facts, interest in the problem and command over language, but largely on the form of report. Communicative clarity is completely the reporter's responsibility depending on his hold over the facts, ideas and thoughts.

The Popular Report :

This report for the layman is intended to explain the broad facts, findings and recommendations. It must be lucid, simple and avoid distortion and jargon. This type of report should consist of more than mere catalogue of facts. The purpose of the report is to make the layman to understand the scientific knowledge of the researcher.

Report for the administrator / Executives :

This report is for the administrator or business executives or for a few fellow researcher. These reports are intended for decision makers. The busy business executives want primarily the "meat" of the research project — that is, the major conclusions and recommendations of the study. This report would be medium size, with some technical details and supporting data followed by a summary and the principal recommendations.

The Technical Report :

It is a report by a researcher for another researcher. That is, these reports are usually intended for scientific or technically trained persons. They would be interested particularly in specific descriptions of the entire procedures employed which would follow the introduction of the problem and hypotheses researched. They are

also interested in the logical and statistical details that led to the conclusions. Tests of statistical significance tend to be desired by the readers. In giving conclusions, the whole development of the underlying data and reasoning to be given for the technical reader. These reports may also contain complicated technical appendices of on the methodology and complete bibliographies to provide the reader with further sources or substantiation. The technical report may be in different forms :

- i) a detailed report, generally by a specialist or by one investigating a particular aspect in the research team.
- ii) a monograph *a study of a single subject*
- iii) an article for a professional journal and
- iv) full technical report.

The language, and presentation, volume and kind of explanation would vary among these four forms of technical report.

In any branch of research — physical, natural or social sciences, the following questions have to be answered in the research report.

- i) How and why is the study made?
- ii) What are the definitions, concepts and hypotheses?
- iii) What are the methods and techniques employed?
- iv) How are the results and implications arrived at?
- v) What are the questions and issues still remain unanswered?

These similar questions hold true in any branch of knowledge.

Thus there are four important aspects in the technical report.

- a) the nature of problem
- b) the research procedure (methodology)

c) the data analysis and the results

d) the implication drawn from the results.

The information regarding these points are necessary to give adequate information to the readers. ^{the above should be included in the report}

In any research project, writing the report forms the tail-end of an investigation. There are two stages in preparing the report. (i) during the investigation and (ii) after data collection, analysis and interpretation. The nature of problem, the methodology, the objectives and hypotheses of the study may be done even before starting the investigation. There should be movement of the report along with the development of the investigation.

There are three main stages in preparing the research report :

a) organisation / structure

b) write-up and

c) documentation.

Before discussing these three major stages in preparing research report, it is imperative to know about the structure of research report, which is either in the form of dissertation or thesis.

General format of the Research Report :

(In presenting the research report either in the form of thesis or dissertation, there are a number of format specifications which the writer should follow.) These specifications allow the writer to encompass his own contribution within a conventional framework which is both logical and sequential.

(Generally, the mechanical format of a research report consists of three parts.)

Before Invest
Nature of
1) the problem
2) methodology
3) objectives
4) Hypothesis

- i) the preliminaries
- ii) the text and
- iii) the reference material.

The individual items in these three sections are the following :

i) **The Preliminaries :**

- a) Title page
- b) Preface, including acknowledgements
- c) table of contents
- d) list of tables
- e) list of figures.

ii) **The Text :**

- a) Introduction (Introductory chapter)
- b) Main body of the report (usually divided into chapters and sections)
- c) Conclusion (Summary chapter)

iii) **The Reference Material :**

- a) Bibliography
- b) Appendix / Appendices
- c) Index (if any)

Conventions of Writing — the Question of style in Research Reporting:

For any researcher, determination of format will help them to be consistent throughout their research work. The content of

1. research report as well as the presentation of argument in a standard form are also so vital in research reporting/writing. The researcher is also counselled to read widely on the special problems of form and style in thesis-writing with particular reference to that subject area of his research. Once the format to be used has been determined, the researcher must be consistent throughout the writing.

3. The same format & style should be followed throughout the writing.

The Research work would be considered as a contribution to the existing knowledge of a particular discipline only when it is adequately communicated. (Writing the report precisely requires a careful choice of words which will serve to convey exact meaning. Good research may be marred by poor reporting. Proper presentation is an integral part of the whole project.) Colloquial, conversational or other modes of expression (as in novels) are inappropriate in a thesis. (Scientific writing of research report is not of personal or conversational in nature. Usually, in thesis / research writing, a third person is used. As general rule, personal pronouns such as I, we, you, me, my, our and us should not appear except in quotation. A thesis should not consist of the reporting of personal experience or opinion; but it should be critical analysis of a problem and presentation of evidence relating to that problem.)

11. Sentences used in research reporting should not be complex. Being scholarly is not being verbose, ambiguous or pompous.
12. Sweeping statements and exaggerated claims should be avoided. Sound reasoning and intellectual honesty are allmarks of scholarly style.
13. Quotations must be accurately cited and suitably acknowledged.
14. The contributions of other writers must be recognised.

15. Research Report ^{Should contain} recounts what has already been done, so it should be written in the past tense. There should be good reason for using present and future tenses.
16. Accurate spelling both for common words and proper names is

essential for scholarly writing. ¹⁸ An authoritative dictionary should be referred for correct spelling. ¹⁹ Attention is also needed for grammar and punctuation. In thesis/research writing on no account ²⁰ abbreviations such as & and i.e., be used. (Abbreviations are acceptable in tables) ²¹ Research report is the culmination of the ²² substantial

Writing the Research report is much more than a term paper. It normally represents the culmination of a substantial piece of original work over a period of time. ²² Some research replicates previous research with the motive of testing the reported findings of that research. Some research works build on existing studies in order to refine or qualify the findings of earlier studies. In all cases, the research work is expected to make an original contribution to knowledge. Thus all the specifications mentioned above to be taken into consideration by the researcher while he is writing the research report.)

STRUCTURE OF RESEARCH REPORT (CONTD.)

In preparing a research report, the first stage is ordering the parts and planning the writing. This organisation or structure of research report forms the base for preparing the report. The researcher has to plan how to arrange his ideas in a logical order. A well-conceived form helps to overcome wrong emphasis and to distribute the emphasis in the right places. This makes the work attractive and readable. In research writing, form and content are inseparable. (For getting good communication, organisation of report is essential. Careful and patient planning are required to get good organisation. (Communication of research results could be easily done by giving attention both for language and planning or organisation of the report.)

Types of organisation :

Broadly, the organisation is categorised into three—the topical, the chronological and the mixed. The *topical* or *horizontal* organisation indicates topics and sub-topics as basic to the writing and interrelates one topic with the other. Majority of the investigations belongs to this category. The *chronological* form of organisation emphasizes the time and developmental aspects. The other form of organisation is a *mixed* form. It depends upon the research problem, and purpose, the time available for investigation, volume of data and other factors. It is thus best to combine the two approaches and adopt mixed form in structuring the report.

Whatever may be the form of report, transition to be taken into consideration even before writing begins. Transition that demands unity, sequence and coherence of facts and ideas in the whole report. Emphasis on communication with and audience demands hard and patient work on the facts, careful and critical assessment and intelligent planning of the organisation of the report.

Content of the Research Report :

The business executives or the fellow researcher who reads a research report to be told enough about the study so that he or she can plan in its general scientific context, judge the adequacy of its methods, and thus form an opinion of how seriously the findings are to be taken and if the reader wishes to repeat the study with other subjects. In order to give the reader the necessary information, it is necessary to detail the method and the general theoretical approach followed in the study. Therefore the technical research report must cover the following points :

- i) introduction which deals with statement of the problem with which the study is concerned and the scope of the enquiry.
- ii) the research procedure (methodology), the study design, the nature of sample, the data, collection techniques, the method of statistical analysis.
- iii) the results
- iv) the implications drawn from the results.

1. Introduction :

A research report should begin with an introduction dealing with

- i) the nature of problem and
- ii) the scope of the enquiry.

The reasons for the study and its place within the theoretical context have to be explained and the reader must be prepared to follow the course of the report to enable him to appreciate fully the material, method and results. But these three aspects need not be elaborated in introduction, such elaboration to be done in the succeeding pages. It is useful to discuss the importance of the problem and the investigation. The major findings will have to be mentioned in the introduction. The main purpose of the "introduction" is to give a lead or a perspective to the reader.

An introduction should be written with considerable care with two major aims in view

- i) introducing the problem in a suitable context and
- ii) stimulating the reader's interest. If introductions are dull, aimless, confused and lacking in precision, direction and specificity, there is little incentive for the reader to continue reading.

The length of the introduction varies according to the nature of the research report. An introductory chapter usually contains the following :

- i) A lucid, complete and concise statement of the problem being investigated or the general purpose of the study.
- ii) A justification for the study, establishing the importance of the problem. In some disciplines, it is appropriate to indicate the limitations of the project and to define terms used in the study.
- iii) A preview of the organisation of the rest of the report.
- iv) A brief statement of the sources of data, the experimental procedure, and the proposed statistical treatment of the findings is included in the introductory chapter

of small research papers. In a major experimental thesis, a separate chapter is often devoted to these aspects under a chapter on 'methodology'.

2. Statement of the problem :

The first step in the research report is the formulation and development of research problem— that is, the issue investigated or hypothesis tested. Ordinarily, the research report starts with the statement of issue on which the study was focussed. Enough background should be given to make clear to the reader why the problem was considered worth investigating.

For example, a study is undertaken at the request of an institution to ascertain reactions to a proposed change in personnel policy may be planned and carried out in such a way that it provides evidence on the manner in which an individual's role within the organisation influences his or her perception of the new policy. However, it should be recognised that not all studies have a direct bearing on theoretical issues. At the present time, many research studies are of necessity carried out without the guidance of a systematic theory. In addition to indicating the practical or theoretical importance of the question investigated, the statement of the problem should include the hypotheses of the study if any were formulated and definitions of the major concepts employed.

Sometimes, the researcher may not be clear about the concepts and the hypotheses. He may be unable to distinguish clearly between major and minor issues; he may be understate facts or overstate the findings. These drawbacks are true in the case of the beginner in the research. He may become careless especially after a laborious process of collecting and processing the data. In order to avoid these difficulties, the chapter on the statement of the problem should explain the scope of the study, pointing out clearly the limits and limitations are if any in the study. In every study,

it is necessary to state the limitation of the study such as the time and the finance allowed and restrictions of length in reporting it. These should be clearly defined. Moreover, it is necessary to make certain assumptions. If assumptions are made in the study they should be stated clearly. Nothing should be taken for granted.

3. The Methodology/Research Procedure :

The scientific reader needs to know in considerable detail how the study was carried out. The methodological chapter is the most ^{conclusive} crucial in the technical report. It indicates to a fellow researcher the hold the young investigator has over the technical apparatus. If the technique is new or modifies a current one, the explanation and discussion should elaborate the direction and extent of the changes. If the technique is well-known and commonly utilised, elaboration and insignificant details are to be avoided by the researcher. The discussion under the methodology chapter should be related to three items.

i) the basic design of the study :

If the study is an experimental one, what are the experimental manipulations? If it is through questionnaire, what are the question and the nature and kind of interview? —everything as to be determined.

ii) the nature of sample :

Regarding the sample used in the study, readers should be told: Who are the subjects? How many are there? How are they selected—that is, the subject—the universe, the sample size, choice etc are to be determined. These questions are crucial for estimating the probable limits of generalizability of the findings. Nevertheless, the number and characteristics of the subjects on which the findings

are based should be clearly stated-so that, readers can draw their own conclusions about the applicability of the findings to other groups.

iii) the data collection techniques and statistical analysis of data :

It is essential to discuss throughly the type of data employed, their sources and characteristics. If a field survey, describe in full the manner of conducting it and discuss response rates, validation and representativeness of the sample, etc. If the secondary data are used—example, Reserve Bank of India Bulletins, the National Sample Survey Reports or the Union and State Budget Publications—explain how far original sources are checked for suitability of data to the problems. Scientific readers are concerned with the statistical analysis of the data by using statistical tools and techniques. Ordinarily, it is sufficient simply to name the technique used. If the technique is a new one, formulas are to be given.

4. Presentation of facts :

The next step is the presentation and analysis of the data leading to their interpretation. In the case of field work, the findings should be substantiated by supporting statistical tables, charts, diagrams and so on. In the case of bibliographical research, the findings should be substantiated by adequate citation of the source. The place and form of substantiating data depends on.

- a) how new the findings are and
- b) how much is required in the text to support the conclusions.

Avoid too many tables, charts, too much of statistics or too much of citations. Condense the supporting data in the text to the minimum. If it is absolutely necessary to give proof, relegate the details to the appendix.

To the administrator in particular, the findings are all important. The findings need not necessarily be positive, in the sense of giving a direction or suggesting the course of action to be taken. It may be negative; contemplating the administrator or the hypothesis formulated by the researcher himself may be found undesirable or not proved. The basic rule in presenting findings is to give all the evidence relevant to the research question asked, whether or not the results are in accord with the investigator's views. This is the cardinal rule of scientific reporting.

The first essential in presenting the finding is, to make them plain and understandable. Clarity, precision, correct emphasis and proper sequence become all important. It is necessary to explain how the findings are derived from the preceding data and how already known facts are relevant to the current investigation. This requires avoiding written explanation where tables and charts in the text are simple. One of the weaknesses among the young researcher is the repetition of statistical tables in literary language. Young researcher very rarely integrates his facts and conclusions with current ideas or theories. It is essential to indicate clearly and precisely how far his investigation agrees with other findings and how far it differs; making it plain why it differs, and to what extent such differences suggest further investigation. The main weaknesses in young researchers are.

i) They attempt to make their report "scientific" either by using jargon or by becoming highly abstract. The more complicate the problem and more revealing the findings-the simple must be the language and the clearer must be the correlation between results and the data.

ii) Another weakness to be avoided is attempting to draw a line between findings and conclusions. Findings flow directly from

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facts and conclusions are derived from findings. Facts should never be twisted to one's own prejudices. Thus the researcher should have an unbiased mind, infinite patience and careful thinking.

6. The Implication :

A bare statement of the findings is usually not enough to convey their meaning, usually the reader is interested in their implication for the general understanding of the research problem. Discussion of these implications is sometimes combined with the presentation of the data, sometimes, it is placed in a separate section. Usually, it includes there major aspects.

- i) a statement of the inferences drawn from the findings which may be expected to apply in similar circumstances. The inferences may be at a level quite close to the data or may involve considerable abstraction.
- ii) the investigators should note conditions of their studies that limit the extent of legitimate generalisation. They should remind the reader of the characteristics of their samples and the possibility that they differ from larger populations to which one might want to generalise.
- iii) implications will usually include relevant questions that are still unanswered or new questions raised by the study.

Thus implications pin-point the real significance of the facts and findings.

7. The Conclusions :

Facts are what the researcher found, findings are what were logically derived from the facts and implications are what the researcher was able to draw from the findings themselves. The conclusions are in fact, the researcher's final assesment of what

the data and the findings mean. The conclusions have to look backward to the work done to the facts, findings and implications and look forward to the application of these findings and implications. In this stage, the researcher demands three things.

- i) Overall control of the work done earlier, becomes essential.
- ii) It requires the ability not only to sift the grain from the chaff but also to comprehend the essence of the investigation and
- iii) it requires the suppressions of personal prejudices so as to prevent possible alternative conclusions.

8. Recommendations :

Recommendations have even a still larger does of the personal preferences of the researcher. They are his suggestions as to the best course of action in practice. Recommendations may or may not be acceptable and in fact may not even be correct. Consequently, the recommendation and conclusions must be in clear, categorical and crisp terms. The researcher's job is not to dictate but to suggest; bearing in mind that any piece of investigation is only one of the factors helping to decide policy and therefore his suggestions may not find acceptance.

9. Summary :

A summary of the investigation would be highly useful. It is customary to include with a very brief summary restating in barest outline the problem, the procedures, the major findings and the major conclusion drawn from them. Its purpose is to enable the reader to get a quick overall view of the work. No new idea or fact should be introduced in the summary.

Outline of a simple model of Research Report :

There is no standardised model. Depending upon the nature and scope of the research problem, the research model will differ. The following is an outline of a simple model of a research report.

I Preface

(Acknowledgements, table of content, declaration of researcher etc)

II Introduction (Formulation of the problem)

- i) Nature of the problem
- ii) Importance of the study
- iii) Objectives and scope of the investigation
- iv) Hypothesis (one or more,) if any
- v) Assumption and limitation of the study
- vi) Chapterisation.

III Description of Methodology

- i) Definitions—Concepts—instruments (if any)
- ii) Description of the method, (sources of data and statistical tools used in the study)
- iii) Sampling techniques (field/statistical enquiries)
- iv) Data collection techniques.

III. Description of the study area :

Area description in terms of topography, demographic feature, administrative set up, infrastructure etc.

V. Presentation of Facts : (Analysis of data)

- i) nature and volume of facts
- ii) statistical analysis
 - a) Primary data analysis
 - b) Secondary data analysis

VI. Findings of the study :

- i) findings with supporting data in each case.
- ii) comparison with the similar studies.

VII. Summary and Conclusions :

- i) Summary
- ii) Implications and conclusions
- iii) Recommendations of the study (if any)

VIII. Appendices :

- i) Discussion of particular statistical techniques.
- ii) Detailed discussion of terms, definition etc.
- iii) Form of questionnaire/schedule.
- iv) Additional tables, raw data, lengthy quotations etc.

IX. Bibliography