MANONMANIAM SUNDARANAR UNIVERSITY

Tirunelveli

Directorate of Distance and Continuing Education

M.Com., Second Year

RESEARCH METHODOLOGY

Syllabus (Common for all Groups)

I. Meaning - Definitions, Objectives and qualities of good research - Types of Research

II. Identification and formulation of Research Problem

III. Research Process

IV. Research Design

V. Formulation of Hypotheses

Collection of Data - Primary and Secondary - Merits and demerits - Sources of Secondary data - Methods of Collecting Primary data - Observation, interview, Questionnaire, Schedule.

VI. Sampling Methods & Techniques - Types - Advantages, Limitations - Steps of Sampling - Sampling & Non - Sampling errors.

VII. Research Reports- Style of reporting- essential of a good research report -use of diagrams and graphs - Mechanics and format of a research report.

Books Recommended

Anderson, R.L. Statistical Theory and Research

Bancract, T.V. Mc Graw Hill

Young P.V. Scientific Social surveys and Research, Prentice Hall

Kothari, C.R. Research Methodology Methods & Technique

Saravanavel Willey Eastern Limited, New Delhi Mahal, Allahabad.

INDEX

RESEARCH METHODOLOGY

CONTENTS

CHAPTER I
MEANING AND TYPES OF RESEARCH

Every man is interested in knowing more and more about the things happening around him. The need for developing knowledge is always present. Research is a search for knowledge. One of the methods of giving knowledge is research. Man has a thinking mind, and he is not satisfied with the available knowledge. He is interested and curious to know more, and more. When he cames across a news idea or product or a new phenomenon he asks many questions like why, how, and when? This attitude is never ending and it has become a part of human nature.

Man faces many problems in his social, economical, commercial, scientific and cultural aspects of life. He wants to know the methods of solving such problem. The desire leads to research. Only because of research, man is able to improve in all spheres of life. Knowledge enables a man to understand, explore, control and predict and so helps to face any situation.

Meaning of Research

The word 'research' is derived from the French word 'rechercher' which means 'search back'. Research is the process of a systematic and in - depth study. Research is directed towards finding solution to problem. Research is based on experience and evidence. Research in any particular topic should be backed by collection, compilation, presentation and interpretation of relevant data. The art of scientific investigation could be termed as research. According to Advanced Learners Dictionary the word research means, "A careful investigation or enquiry specially through search for new facts in any branch of knowledge". Research means a systamatized effort to gain new knowledge. Research is an original contribution to the existing stock of knowledge making for its advancement.

DEFINITION OF RESEARCH

The following are some of the definitions from reknown authors.

Fred Kerlinger

"Research is an organised enquiry designed and carried out to provide information for solving a problem".

Francis Rummel

"Research is careful inquiry or examination to discover new information or relationship and to expand and to verify existing knowledge".

Rober Ross

"Research is essentially as investigation, a recording and an analysis of evidence for the purpose of gaining knowledge".

D. Selsinger and M. Stephenson in the Encyclopaedia 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".

According to John W. Best

"Research may be defined as the systematic and objective analysis and recording of controlled observation that may lead to the development of generalisations, principles, or theories, resulting in reduction and possibly ultimate control of events".

Functions of Research

One of the most important functions of all research is the discovery of the truth of facts. Research is undertaken to discover answers to certain questions by applying the facts. Research helps to answer the problems or issues confronted in a particular area. For example, Research tries to answer many broad questions like how liberalisation of licence helps for the development of a country or how science can bring changes in the material life of human beings without affecting its cultural background or what reasons are there for increased rate of industrial sickness and what steps can be taken to remove the increased rate of industrial sickness and similar areas of macro micro in nature. The following may be the specific functions or objectives:

1. To find new techniques or generalizations with old data.
2. To add to existing conclusions or generalizations to new data.
3. To attempt arriving at more conclusions from the same set of data.
4. To put forward an original or new theory or idea to discover the unexplored horizon of knowledge.
5. To resolve the contradictions contradictions existing in the area of study.

Motivation for Research

The important motivations for undertaking research activities are as follows:

1. To get research degree which may help raising the social status of the person and to get promotions in their job.
2. To face the challenges in solving the unsolved problems in life.
3. To get intellectual satisfaction by entering into creative research area.
4. To do service to the nation and to the humanity at large.
5. To gain status amidst intellectual prodigies.

Although all the above desires may be motivating forces in all cases, in certain types of research, any one desire may dominate over others. It is to be noted that the actual motivation for undertaking any research activity will determine to some extent the nature, quality, depth and duration of research.

Significance of Research

All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention. Increased amounts of research makes progress possible. Research inculcates scientific and inductive thinking and it promotes the development of logical of thinking and organisation.

The role of research in several fields of applied economics, whether related to business or to the economy as a whole, has greatly increased in modern times. The increasingly complex nature of business and government has focused attention on the use of research.

Research, is an aid to economic policy, both to government and business.

Research provides the basic information for nearly all government policies in our economic system. Decision - making may not be a part of research, but research certainly facilitates the decisions of the policy - maker. Government has also to chalk out programmes for dealing with all facts 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 problems of distribution, even the size and nature of defence services are matters requiring research. Thus, research is considered necessary with regard to the allocation of nation's resources.

Research has its special significance in solving various operational and planning problems of business and industry. Market research is the investigation of the structure and development of a market for the purpose of formulating efficient policies for purchasing, production and sales. Operations research refers to the application of mathematical, logical and analytical techniques to the solution of business problems of cost minimisation or of profit maximisation or what can be termed as optimisation problems. Motivational research of determining why people behave as they do is mainly concerned with market characteristics. It is concerned with the determination of motivations underlying the consumer behaviour.

Research is equally important for social scientists in studying the relationships and in seeking answers to various social problems. It provides the intellectual satisfaction of knowing a few things just for the sake of knowledge. The significance of research can also be understood keeping in view the following points:

a. To those students who are to write a master's or Ph.D. thesis, research may mean a career or a way to attain a high position in the social structure.
b. To professionals in research methodology, research may mean a source of livelihood.
c. To philosophers and thinkers, research may mean the outlet for new ideas and insights.

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

e. To analysts and intellectuals, research may mean the generalisation of new theories.

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

Social Research

Like physical, biological and technological research, social research is one of the major fields of research. Social research includes research in social sciences, humanities and languages.

Social science such as economics and sociology regard man not as an isolated individual, but as a member of a group. This involves the observation of the behaviour of individual in groups and proceeding further to new area.

Social research studies the value, beliefs, traditions, events etc. It also finds out new facts and verifies the old facts on the basis of the touch stone or tests applied to old facts. It is in fact the scientific method for the study of the social life in scientific manner. It also studies the dynamics of social relationship and social phenomenon.

Therefore a social research deals scientific investigations undertaken in the field of social sciences and also in behavioural sciences. However, it must be remembered that the social research is a very broad area within which there are many sub - classes. According to P.V. Young, social research is "the systematic method of discovering new facts or verifying old facts, their sequences, their inter-relationships, casual explanations and the natural laws which govern them". "According to Herring", "Scientific research is a cumulative process; it is also a repetitive process; especially in the social sciences, the understanding can be advanced not only by gains in knowledge but also by discovering outworn assumptions". Slessinger and Stevenson has considered that social research is a systematic method of exploring, analysing and conceptualizing social life in order to extend correct or verify knowledge whether that knowledge aids in the construction of a theory or in the practice of an art. Thus social research involves the application of scientific methods for the understanding, studying and analysing of social life in order to modify correct or verify the existing knowledge as a system. However, the social research has some distinctive characteristics as it deals with the human behaviour and social problems. But social science research can not be as precise as research in physical sciences owing to greater heterogeneity of social data.

PURPOSE OF SOCIAL RESEARCH

The following are the main practical utility of social research.

1. Social control

Knowledge is power. Social research equips one with detailed and sufficient knowledge about the working and organisation of society and its institutions. The growth of leadership is thus facilitated by social research.

2. Social planning

"To have a good planning systamatic knowledge of the resources and problems is necessary. Social research gives us the detailed picture of the complicated aspects of social planning. So a rational and optimal social plan can be formulated.

3. Social understanding

Social research pinpoints the need for interdependence among different social groups. It helps to promote goodwill and understanding. Social research brings out unity among diversities and helps to strengthen social cohesion.

4. Social growth

Social research points out to the society a right way of development by pinpointing the evil efforts of wrong course of action. The direction for social growth can be given by social research by the study of social organisation, institutions, values, motivations and so on.

5. Social prediction

Social research gives a sound basis for prediction in a large number of cases. On the basis of the reasonable value of prediction, better social control and planning can be attempted through social research.

6. Social welfare

Social research helps to identify the causes of social evils, and thus helps to take necessary steps for eradication of social evils. Social research can be given sound guidelines for appropriate measures of social reforms and social welfare.

Business Research

Research is an ingredient in all the functional area of commerce and economics. The success of personnel management largely depends upon a systamatic research. Business managers spent most of their time in decision making process. Research helps them to take good decisions. By adopting research findings in the behavioural science to business situa-

tion, business can be managed easily. Research in business areas covers a wide range of subject area.

In recent years considerable research has been done on small scale industries, agriculture, cooperative enterprises and banks. Business research is relatively young and only recently methodology of science has been applied to business research.

The following are some of the areas in business research:

A. Financial Management Research

1. Capital structure of companies
2. Valuation of companies
3. Acquisition and merger of companies
4. Sources of funds and cost of capital
5. Management of assets.

B. Production Research

1. Capital budgeting
2. Product innovation research
3. Cost reduction research
4. Product design analysis
5. Quality control studies.

C. Research in Marketing Function

1. Marketing policy of a product
2. Pricing policy of a product
3. Advertising policy of a product
4. Channels of distribution
5. Buyer motivation

D. Personnel Research

1. Job and manpower requirement
2. Job evaluation
3. Training and development of employees
4. Employees morale
5. Labour relations

E. Co-operation

1. Co-operation and planned economy
2. Overdues in co-operative societies
3. Co-operatives and weaker section
4. Management of co-operatives
5. Factors contributing to success of co-operatives

Requirements of a Good Research

Whatever may be the types of research works and studies, one thing that is important is that they all meet on the common ground of scientific method employed by them. One expects scientific research to satisfy the following criteria:

1. The purpose of the research should be clearly defined and common concepts be used.
2. The research procedure used should be described in sufficient details to permit another researcher to repeat the research for further advancement, keeping the continuity of what has already been attained.
3. The procedural design of the research should be carefully planned to yield results that are as objective as possible.
4. The researcher should report with complete frankness, flaws in procedural design and estimate their effects upon the findings.
5. The analysis of data should be sufficiently adequate to reveal its significance and the methods of analysis used should be appropriate. The validity and reliability of the data should be checked carefully.
6. Conclusions should be confined to those justified by the data of the research and limited to those for which the data provide an adequate basis.
7. Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity.

In other words, we can state the qualities of a good research as under.

1. 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. Systematic characteristic of the research does not rule out creative thinking but it certainly does reject the use of guessing and intuition in arriving at conclusions.

2. Good Research is Logical:

This implies that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out research. Induction is the process of reasoning from a part to the whole whereas deduction is the process of reasoning from some premise to a conclusion which follows from that very premise. In fact, logical reasoning makes research more meaningful in the context of decision making.

3. 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 provided a basis for external validity to research results.

4. Good research is replicable:

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

QUALITIES OF A GOOD RESEARCHER

A researcher in one who knows more and more about less and less. This shows that a good researcher must have a specialised area of interest. It is almost impossible to indicate the actual qualities of a good researcher. However, some broad qualities of a good researcher may be indicated in the following general way:

1. Scientific mind

A researcher must have a scientific frame of mind. He should not be influenced and guided by pride and prejudice, and the superficial facts. He must give up personal likes and dislikes. The enquiry must be performed along scientific lines. He must be bold enough to discover new things and to discard superstitions and taboos.

2. Seeker of truth and knowledge

A researcher must be a seeker after truth. Therefore, he himself must be truthful and sincere. He must have the desire for knowledge. The lure of discovering the unknown fact is the starting point of the research. A researcher has to be prepared to make any type of sacrifice in terms of time, money and energy to find out the real truth.

3. Alertness, insight and imagination

A scientific mind must always be alert to appreciate minute changes in situations. This habit has to be patiently cultivated and practised. The mind must be prepared to work under all circumstances. A researcher should be accurate in observation, quick in perception and must have precision of statement. His mind must be thoroughly disciplined. He must have a high degree of imaginative power and be able to catch the clues by probing deep into the matter.

4. Quick power of understanding

A research worker should have the ability to grasp things quickly so that he is in a position to make the best of his research.

5. Trained and educated

A researcher must have intimate knowledge of his area of research. The concepts, symbols and the implications of his project must be very clear to him. He must have sufficient experience and training to understand, analyse and tackle the problem. A researcher

must have an analytical mind. Simple description of a problem is no research. The results must be found out by rigorous method. Therefore, a researcher must be acquainted with the sophisticated and latest technique of research. He must be very clear about the methodology he is following.

6. Patience and perseverance

Research is a curious mixture of success and failure. It is an intellectual exercise requiring endurance and patience. A researcher must not feel defeated at any state. He requires supreme courage of conviction. It may require many years to complete a research project, and the researcher must not give up hope.

7. Objectivity

A researcher must be objective in his approach. A scientist must try to avoid sentimental and emotional interpretation of his result. He must have an open mind. He must also by very cautious in his approach.

8. Knowledge of scope and limitations

A researcher must clearly know as to what he is going to show and how he can prove his case. He must have the capacity to clearly distinguish. But he must not be too ambitious. He must know his limitations and constraints. A good researcher must be able to answer who, what, when, why, how and so on, in relation to his own topic of research. He must know where to begin and where to end.

TYPES OF RESEARCH

Different authors have classified research in different ways. It is very difficult to classify research into some universally accepted categories. There is no clearcut distinctions among different types of research. The classification of research helps to formulate appropriate research design. The following are the different types of research:

1. Pure research

It is also called as fundamental or basic research. Pure research is undertaken to satisfy the researcher's thirst for knowledge. In pure research, knowledge is gathered for the sake of knowledge and it is not concerned with solving any particular problems. Pure research is concerned with generalisations and formulations of a theory Pure Research is directed towards finding information that has a broad base of application and thus adds to the already existing organised body of scientific knowledge.

Joan Robinson's 'Imperfect competition' and Chamberling's 'Monopolistic competition' are termed as pure researches. Similarly research studies concerned human behaviour

carried on with a view to make generalisations about human behaviour can also be termed as pure research.

J.M. Keynes in his book, "General Theory Employment Interest and Money" published in 1936 explained the ways and means to attain the goal of full employment throughout the operation of the Central Bank. He has established that by a steady increase in the total spendings of the economy, the economy can attain the goal of full employment. His theory is applicable to developed economics and not relevant to the developing economics. The findings of the economist have enabled the Americans to revive the economy from the great depression of 1930's.

Pure research is largely limited to the academic world, where educational, governmental and foundation financing enables it to survive.

2. Applied research

It is also called as action research. Applied research aims at finding a solution for an immediate problem facing a society or an industrial organisation or a society or an industrial organisation or a businessman. So applied research has practical value. Practically all social science research undertaken in India are of this type. Applied research helps formulation of policy. Applied research is concerned with actual life. It discovers what, how and why of actual life.

For example, a businessman wants to study the effectiveness of different sales promotion measures. For this purpose he selects different areas and introduces different methods of sales promotion say free gift in Tirunelveli district, extra quantity in V.O.C. district, price off in Kanniyakumari district. After a month he compares the sales in different areas and can decide about an effective sales promotion measures. This is an applied research in the field of business.

3. Historical research

It aims at developing a solution with human intelligence to unsolved social problems on the basis of past events, past trends, facts and attitudes. So a great deal of social insight and historical orientation is necessary for the purpose. It is necessary to take both analytical and synthetic view of the facts. The historical research is always conducted with the help of information and data collected from old records, documents or by studying the events of the past in books and journals.

This method has certain limitations. Firstly it is difficult to get reliable and adequate data. The second limitation relates to the method of keeping the record. The third is the dispersal of documents and the needed documents may not be available in one place. Fourthly

the data and inferences cannot be verified. Calculations and measurement as in statistical methods are not possible.

For example a study of factors influencing the growth of location of textile mills in Tamil Nadu is an historical research. The factors to be identified by the researcher would be technical, financial, marketing, personnel, political and social factors. All these factors are of historical value. The development of such research is made by taking into account the source document and the interpretation of the hypothesis.

The main sources of historical data includes books, documents, newspapers, magazine, diaries, memories, confessions, autobiographies, sacred archived, suppressed inventions, personal letters, personal agreements, witness, information from person who observed, diplomatic agreements, artistical materials, historical paintings, portraits, charts, maps, inscriptions, monuments, time capsuls, carvings and the like.

4. Descriptive research

Descriptive research includes surveys and factfinding enquiries of different kinds. A descriptive research may be simple or complex. It determines who, what, when, where and how of a topic. The major purpose of descriptive research is description of the state of affairs as it exists at present. In social research and business research we use the term ex-post factor research for descriptive research. The main characteristic of this method is that the researcher has no control over the variables. He can only report what had happened, or what is happening. It is concerned with describing the characteristics (eg. the extent to which libraries are used by people), estimating the proportion of the people in a specified population hold certain attitudes, (eg. Howmany people favour the policy prohibition of liquor?) and discovering or testing whether certain variables are associated (eg. people who spend a lot of time for reading and watching television).

5. Analytical research

In analytical research, the available information or data are analysed and critical evaluation are also made to solve the problems. In this connection, both quantitative as well as qualitative data or information are statistically treated for the purpose.

6. Experimental research

The laboratory experiment is the basic tool of analysis in natural and physical sciences. It is helpful to know the cause and effect relationships under controlled experiments. But in social sciences experimental research has only a limited application as to test a hypothesis having a relationship among various variables. The experimental research is carried out in two different stages, such as the trial and error approach throughout the con-

trolled experiments by precise definition of terms, concepts, etc.

There are three types of experiments :

a. The natural or uncontrolled experiments through observations.
b. The laboratory experimental research in physical and natural sciences through variations in the conditions and observations.
c. The experiments in the field for social sciences through the conclusions evolved by changes in the variables.

7. Exploratary research

When the purpose of research is to gain familiarity with a phenomenon or to achieve new insights into it in order to formulate a more precise problem or to develop hypotheses, the exploratory studies are generally made. As the theory is too general or too specific, hypothesis cannot be formulated. Therefore exploratory, research is necessary to obtain experience that will be helpful in formulating relevant hypothesis for more definite investigation.

For example a researcher in the field of transport is interested to study the contribution of commuters (daily travellers or season ticket holders) to the revenue of railways. The researcher is not in a position to formulate any precise hypothesis. In such cases exploratory research will be of more useful.

Besides, this study may, however, have other functions as follows:

a. Clarifying concepts
b. Increasing investigator's familiarity with the phenomenon they wish to investigate
c. Establishing priorities for further research
d. Providing a census of problems regarded as urgent by people working in a given field of social relations.

8. Comparative research

It is common thing to discuss the financial position, profitability, customer's attitude of a concern, comparing with other similar institutions. Comparative method does not consist mainly in drawing comparisons, but in explanation by means of comparison. Comparative method is thus a scientific method in which comparative data is collected with a specific purpose and analysed and specific conclusions are derived firm its results.

Before conducting comparative research the following precautions may be followed:

1. It should also be kept in mind that unnecessary facts are not collected.

2. The existing and non-existing factors pertaining to the subject of comparative study should be noted down. It should not be that only existing factors are taken note of and the non-existing factors are ignored.
3. Due care should be taken in drawing conclusions. If the comparison is faulty, there is every chance of arriving at faulty conclusions.
4. It is necessary to prepare a report of the comparative study. This will enable, the reader to know the exact nature of the comparative study.

The comparative method appears to be an easy method of study but actually is very difficult. No conclusion can be drawn very easily from the data and details collected by this method. Varied conclusions can be drawn in a study of one and the same group, community and circumstances and if the groups or communities are different the results are bound to differ.

9. Theory construction research

There are many theories in subjects like Economics, Sociology and Psychology. There are different schools of thought. The views of scholars diverge. A critical evaluation of these views in terms of empirical justification and internal validity is a useful piece of research.

For example two researchers have involved in evolving a model for fair rate of return in two engineering units. The two models are very specific in their application. A researcher can compare the models and assumption which underline the model and suggest which model is better.

The theories to explain the relationship between capital structure, cost of capital structure, cost of capital and value of the firm are :

1. Net income approach
2. Net operating income approach
3. Modigliani-Miller (MM) approach and
4. Traditional approach

10. Quantitative and qualitative research

Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. For instance, when we are interested in investigating the reasons for human behaviour, qualitative research is specially important in the behavioural sciences where the aim is to discover the underlying motives of human behaviour. Through such research we can analyse the various factors which motivate people to behave in a particular manner or which make people like or

dislike a particular thing. It may be stated, however, that to apply qualitative research is relatively a difficult job and, therefore, while doing such research, one should seek guidance from experimental psychologists.

11. Library research

Library research is conducted with the written materials whether published otherwise mostly located in large libraries. This research is concerned with the evolution of theories, study involving cause and effect relationship and seeking out significant facts and interpretation from the past data which are found in journals, reports and directories.

12. Other classifications

a. One time research and longitudinal research. One time research is confined to a single time period, whereas longitudinal research is carried on over several time period.

b. Conclusion oriented and decision oriented research.

While doing conclusion - oriented research, a researcher is free to pick up a problem, redesign the enquiry as he proceeds and is prepared to conceptualize as he wished. Decision - oriented research is always for the need of a decision maker and the researcher in this case is not free to embark upon research according to his own desires. Operations research is example of decision oriented research since it is a scientific method of providing executive departments with a quantitative basis for decisions regarding operations under their control.

c. Individual and group research

The research undertaken by an individual is called individual research. The bulk of research activities in universities, and colleges is made by an individual. This individual research is on the basis of his own judgement, interest and capacity.

d. Group research is undertaken by several researchers. Their activities are co-oriented by a director. Research conducted by a firm, trade association and government agency is performed by a team of researchers under a project director. Research in colleges and universities financed by grants, is on a group basis.

Prepared by

Prof. C. Jeganathan.

CHAPTER - II

IDENTIFICATION AND FORMULATION OF A RESEARCH PROBLEM

In research process the first step is the selection of a research problem and defining it. The selection of a suitable topic for research is a difficult task. The researcher has to devote considerable time and attention in the selection process.

Meaning of a research problem

A research problem, in general, refers to some difficulty which a researcher experiences in the context of either a theoretical or practical situation and to obtain a solution for the same. Usually we say that a research problem does exist if the following conditions are met:

1. There must be an individual or a group which has some difficult or the problem.
2. There must be some objective(s) to be attained. If one wants nothing, one cannot have a problem.
3. There must be alternative means (or the courses of action) for obtaining the objective(s) one wished to attain. This means that there must be at least two means available to a researcher for if he has no choice of means, he cannot have a problem.
4. There must remain some doubt in the mind of a researcher with regard to the selection of alternatives. This means that research must answer the question concerning the relative efficiency of the possible alternatives.
5. There must be some environment(s) to which the difficulty pertains.

TYPES OF RESEARCH PROBLEM IN SOCIAL SCIENCE :

Social science research problems may be of three varieties differing in form, content, and mode of verification. They are :

i Empirical problems

When social researchers answer questions or problems on the basis of what they come to know through their sensory organs, these are expressed as empirical problems. Social researchers base their conclusions and findings on what they perceive or observe or sense in order to verify, approve or reject relationship between two or more variables. Suppose it is to be proved that highly advanced countries have stable democracies. Here the social researchers is to verify the relationship between stable democratic government and rate of industrial advancement on the basis of sense experience.

ii. Analytical problems

Analytical problems are not scientific. These are questions whose answers depend on the meaning of words in the sentence expressing them. Analytical problems or statements are merely definitional and not empirical (these are) essentially language and conceptual problems and not factual and scientific problems and answers to such problems depend upon the definition of words in the sentences that express them.

iii. Normative problems

Normative problems are questions whose answers depend primarily on value judgements. Value judgements are statements of what is desirable, preferred, moral, imperative or obligatory. These may take either an evaluative or prescriptive form.

IDENTIFICATION OF A RESEARCH PROBELM

The researcher, who is associated with the practical problems need not identify problems, because he has many problems on hand which needs a solution. But the researcher in an academic institution has to identify possible problems for investigation. The following are some of the sources of selecting a suitable research problem.

1. Consult experts

There are experienced guides or researchers in the universities and research institutions who will be able to help researcher in identification of a research problem. The researcher can attend meetings of trade and professional associations, chamber of commerce, business executives etc. Having a carridor conversation with businessmen and executives will be of much use in identifying a research problem.

2. Become a specialist

It is very difficult to acquire knowledge on a wide area. So the researcher may select a narrow area. He has to study all the materials in the selected narrow area. Thus he can become a specialist in the area selected. Now he can easily identify a problem which remains unsolved in the area.

3. Study of current literature

There are a lot of professional journals in social sciences. A researcher should read such journals, the masters thesis, dissertations etc. In government organisations they may publish report about their activities etc. By a careful study and analysis of such literature, the researcher can find problems which require answers.

4. Technological changes and current development

Technological changes in a fast changing society constantly brings new problems and new opportunities for research. The impact of changed technology on the existing socio-economic set up tempts a researcher to undertake research studies, for example use of computers in business concerns, teller system in banks etc.

5. Unexplored areas

Research problem may also be identified from those areas which have not explored so far. When a new policy is to be implemented by the Government, there will be some

criticisms and objections. Some people may criticize the policy changes. The researcher can read the critical articles appearing in new papers, magazines. Such issues can be discussed with his colleagues, experts, professors and their opinion may help researcher to identify research problems.

6. Problem concerning day to day life

Research problem can also be selected on the basis of current experience of a researcher. A research problem may be identified from the burning problems of the time. The researcher can keep a diary and note down the ideas that comes to him. In the course of his daily work, like reading, conversation with his colleagues and businessman, some idea may flash in his mind. He can immediately note it down and then discuss with others who have enough experience in the same area.

7. Theories in social sciences

There are a lot of theories in social sciences, for example, the Modiglioni Miller approach, in Maslow's theory of motivations. Walter's model on dividend policy etc. The researcher may select a problem for investigation from a given theory in which he has considerable interest. In appropriate situations the researchers must have thorough knowledge of such theories. Some unexplained aspects and assumptions of the theory can be considered for identifying a research problem.

Selection of research problem

The research problem undertaken for the study must be carefully selected. A researcher need not be in a hurry in choosing a problem. Spending considerable time for selecting a topic is necessary for earlier completion of research work.

Out of the identified problems, a researcher has to select one problem. The research work can be completed within the prescribed time, within the budgeted expenditure if problem is carefully selected which will boost the moral of the researcher.

Normally, the researchers select any particular problem based upon several factors. The following factors may direct the scholar prefer one topic over the other:

1. to satisfy a personal interest or curiosity.
2. to furnish a basis for confirming some earlier study or a basis for some future study.
3. to meet a social need, or
4. to serve a utilitarian purpose like personal ambition.

Goode and Hart give the following criteria for the selection a problem for research.

a. The researcher's interest

A researcher may select a problem for investigation on which he has considerable interest. The researcher must have thorough knowledge in the problem selected. If a researcher is not interested in it, he will not be able to face and overcome the obstacles which arise at every stage in the process of research. If the researcher has little interest the project will become more difficult.

His interest should be purely intellectual and should not be there only for a reward, material benefit, advancement in position increased authority and so on.

2. Practicability

The importance of the subject, the qualifications and the training of a researcher, the costs involved, the time factor are few other criteria that must also be considered in selecting problem. In other words, before the final selection of a problem is done, a researcher must ask himself the following questions :

a. Whether he is well equipped in terms of his background to carryout research.
b. Whether the study falls within the budget at his disposal.
c. Whether the necessary co-operation can be obtained from those who participate in research as respondent subjects.

If the answers to all these questions are in the affirmative, one may become sure so far as the practicability of the study is concerned.

3. The urgency of the problem

The results of the study will also be used by the public, in solving their urgent problems. The problems selected should be significant enough and involved an important principle or practice. If the research is not worthwhile to anybody or if it neither adds to knowledge nor leads to any improvement in the current practices, it would be an effort in vain.

4. Expected out come

The results of the research study may give intellectual satisfaction to the researcher. A researcher can publish his thesis. The published thesis should be useful to some businessmen or institution. He gets recognition for his work from his colleagues and outsides. The research study is a service to the profession, institution and the society.

5. Availability of resources

To do research, facilities like funds, clerical and technical assistance, library facilities are needed. Moreover a time limit may be there to complete the research work. A research can be conducted within two months and the same research can also be undertaken for two years. So the time at the disposal of the researcher should be considered. The expenditure involved in data gathering, equipment, printing, test materials, travel etc. should be carefully considered.

Some other factors to be considered while selecting a problem for research are as follows:

1. Novelty

It should be sufficiently original so that it does not involve objectionable duplication. Originality is the credit point of any research. Ignorance of prior studies may lead a researcher to spend time on a problem already investigated by some other worker. Moreover the study should employ the most recent data. While originality is an important consideration, the fact that a problem has been investigated in the past does not mean that it is not

longer fit for study. There is a constant need for verification of the findings of previous investigations, using newer and better devices and procedures. There is also a need for the testing of former findings under changed cultural conditions.

2. Availability of data

The data used in research may be primary data and or secondary data. The researcher has to examine whether the data for the project can be easily collected. In the case of primary data, the researcher has to see whether the respondents will answer the questions. It will be difficult to get information about profit, income etc. In the case of secondary data, the researcher has to see whether the data are available within his reach.

Cocharan and Cox suggest that the prospective researcher should put the following questions and select the problem for research.

1. **Does the field suit to my interest?**
   a. Is the interest purely intellectual?
   b. Is the interest present because of reward or pecuniary returns possibility for advancement in position and increased authority
2. Will the results be of practical or utilitarian significance?
3. Does the field present gaps in verified knowledge which need to be filled?
4. Does the field require reworking or recasting?
5. Does the field permit extension of inquiry beyond the present limits or verified knowledge?
6. Is the field pivotal or strategically from the standpoint of immediate purposes which the results of the proposed investigation are to fulfil?

Notwithstanding the different criteria discussed above, the selection of a research problem remain a difficult and ticklish issue of research particularly to the uninitiated. Apart from the criteria discussed above study of the literature on the topic and the restated topics and discussions with persons who have direct knowledge and practical experience in the field would immensely help the researcher in the selection of a problem.

A young researcher is often tempted to think that his study must result in some extraordinary findings. A thesis today is judged not in terms of revolutionary findings and original discoveries, but in terms of methods of work and analytical abilities.

Defining the research a problem

A problem clearly stated is a problem half solved. The problem to be investigated must be defined without any ambiguity. Defining a problem properly is a perquisite for any study and it is very important. It helps a researcher in many ways.

1. It provides a sense of direction to the research.
2. It specifies the scope of research.
3. It clarifies the problem.
4. It indicates the limitations of the research.

5. It establishes major assumptions.
6. It expresses the context of the research problem.
7. It provides economy in research.

TECHNIQUES INVOLVED IN DEFINING A RESEARCH PROBLEM

Defining a problem means stating the problem along with the bounds within which it should be studied. It involves the task of laying down boundaries within which a researcher shall approach the problem towards the pre-determined objectives in view. A research problem should be defined in a systematic manner giving due weightage to all relevant factors. The stages in definition of a research problem are as follows:

1. Stating the problem in a general way

This is the first step in defining a research problem. The problem should be stated in a general way. For this, it is advisable to do some field observation. The researcher may undertakes a pilot survey, or preliminary survey. Then the researcher can himself state the problem or he can consult the guide or experts in the subject. If any organisation directs the research then they may help the researcher in stating the problem. The problem stated in a broad way may contain various ambiguities. Such ambiguities may be removed by clam thinking on the issues of the problem. The feasibility of a particular solution has to be considered at this stage.

2. Understanding the nature of the problem

The best way of understanding the problem is to discuss it with those who first raised it. If the researcher has stated the problem himself he should consider all the points that induce him to make the general statement. He can have discussion with those who have a good knowledge of the concerned problem. The researcher should also keep in view the environment within which the problem is to be studied and understood.

3. Surveying the available literature

The researcher must be well versed with the relevant theories in the field, reports, records and other relevant literature. All such literature must be surveyed and examined before defining a problem. The researcher has to review the researches already undertaken on related problems. This helps the researcher to know if there are any lapse in the theories, or whether the existing theories applicable to the problem under study are inconsistent with each other. This will enable a researcher to proceed from the existing premise. Studies on related problems indicate the type of difficulties that may be encountered in due course of time. Such studies may also suggest useful and even new lines of approach to the present problem.

4. Developing the ideas through discussion

Various new ideas can be developed by a researcher through discussion with his colleagues and others who have enough experience in the area. This step is also called as experience survey. People with rich experience can enlighten the researcher on different

aspects of his proposed study. Their advice and comments are useful to the researcher. Discussion with such experts not only helps to formulate the problem but also helps to know the technique that might be used, possible solutions etc.

5. Rehearsing the research problem

This is the last stage in defining or formulation of a research problem. The researcher must rehearse the research problem into a workable proposition. Through rehearsing the research problem in specific terms such that it may become operationally viable and help in the development of working hypothesis. Hypothesis is a proposition or principle which is assumed in order to draw out logical conclusions. Once a hypothesis is tested with the help of evidence, it becomes a thesis.

In addition to the above steps the following points should also be considered.

1. Technical terms, words, phrases with special meanings need be defined.
2. Basic assumptions or postulates, if any should be clearly identified.
3. Criteria for selection of problem be provided.
4. Adequency and suitability of the time provided and the source of data must be considered.
5. The scope of the investigation of limitation of the study should be gauged.
6. Topic must be chosed in total objectivity, i.e., without prejudice or bias.
7. Before finalising on the specific subject or research, it is always advantageous to conduct preliminary case studies both for ensuring the viability and feasibility of the project and for identifying the research problem in all its totality and exhaustively.

CHAPTER - III
STEPS IN RESEARCH

Research is an inseparable part of human knowledge. Research is an important prerequisite for a dynamic social order. But this research is to be carried out in an order or manner best suited to the system. Research process consists of a series of actions or the steps necessary to effectively carry out research. In fact there are certain well recognised research steps or procedures for doing research of all kinds. Research process consists of a number of closely related activities. If the researcher follow the steps it will help him to save time energy and will ensure best results. If proper steps in research are not followed, it will confuse the researcher and lead to wastage of time, energy and uncertain results.

The first step determines the nature of the last step to be undertaken. If subsequent procedures have not been taken into account in the early stages, serious difficulties may arise which may even prevent the completion of the study. One should remember that the various steps involved in a research process are not mutually exclusive; nor are they separate and distinct. They do not necessarily follow each other in any specific order and the researcher has to be constantly participating at each step in the research process requirements of the subsequent steps. However, the following order concerning various steps pro-

vides a useful procedural guideline regarding the research process.

1. Tentative selection of problem.
2. Initial survey of literature.
3. Finalising the research problem.
4. Extensive survey of literature.
5. Formulation of hypotheses.
6. Preparing the research design.
7. Determining sample design.
8. Collection of data.
9. Analysis of the data.
10. Hypothesis testing.
11. Generalisation and Interpretation.
12. Preparation of the report.

1. Tentative selection of problem

The first step in research process is to identify a problem. The researcher, who is associated with the practical problem, need not identify a problem, because he has many problems in hand. But the researcher who is associated with academic institution has to identify a problem. There are experienced guides or researchers in the universities and research institutions, who will be able to help them to a large extent. In the government organizations the areas of research are suggested by the administrators or policy makers to suit their needs. However the research worker should see that the problem or topic selected would fit into his academic background inclinations and capabilities. Although the discussion with the experts or guides and seniors will be of immense use to identify the problem of research, the ultimate choice is to be done only by the research workers themselves.

Even at the time of selecting the tentative problem or topic, a quick scanning of the literature is essential so as to avoid the duplication of studies.

1. Consult experts
2. Become a specialist
3. Researchers interest
4. Topic of significance
5. Novelty of the idea
6. Technological changes
7. Unexplored areas
8. Feasibility of the study

Similarly the research worker should also take into account the time and resources available for the successful completion of the project. The resource availabilities in the local libraries should also be taken into account. In this context, it is rightly said that the secret of success in research is frequently as must a matter of selecting appropriate problems as it is of being able to solve the problems that have been selected.

2. Initial survey of literature

A preliminary survey of the literature on the topic should be carried out to find out the possibility of original contribution to the concerned area of knowledge. A study of the current literature in the chosen field will indicate the problems that are being investigated and will suggest further problems for investigation. The researcher should be familiar, too, with recent doctoral studies in his field of interest. Special assignments, term-papers, dissertations, and thesis usually conclude with suggestions for further research.

Generally it is very difficult to know about the current research work in specific area. One may institute inquiries at all important place known for research on one's proposed or intended topic. The possibility of such project topics being under way may be indicated by reading the professional journals and the recent papers, discussions in workshops, conferences and seminars, Encyclopedia of Social Science Research, dissertation abstracts, international and similar publications are rich sources for problem seekers.

3. Finalising the research problem

The research worker should select a research problem after initial survey of literature. The topic or problem selected may have to take into account the following aspects:

1. The topic of research should not be too broad and unmanageable in nature.
2. The topic should not be too narrow or microscopic in nature which will become meaningless for conceptional pattern.
3. The topic selected should suit to his academic background, research skills, knowledge and experiences and thereby it must be appropriate to the person concerned.
4. The limitations such as the availably of time and money should also be taken into account so that the research work is not incomplete in nature.

4. Extensive survey of literature

Once a topic has been decided upon, it is essential to review all relevant material which has a bearing on the topic. Since a research report, either a dissertation or a thesis, is supposed to be a study in depth aiming at contribution of knowledge, a careful check should be made so that the proposed study has not previously been carried out. Completely new and original problems are rare, however a previous study should not exactly replicated unless the techniques used had been faulty or the findings and conclusions are doubtful or unless some new sources of information had been discovered to shed new light on the problem. It is necessary to show how the problem under investigation relates to previous research studies. In some subject areas it is important to locate the problem within a theoretical framework and in such cases the underlying theory needs to be reviewed as well.

The main reason for a full review of research in the past is to know the outcome of those investigations in areas where similar concepts and methodologies had been used successfully. Further, an extensive or even exhaustive process of such review may offer vital links with the various trends and phases in the researches in one's area of specialisation, familiarizing with the

characteristic precepts, concepts, and interpretations, with the special terminology, with the rationale for undertaking one's proposed investigation.

5. Formulation of hypothesis

Every piece of research begin with certain basic assumptions. Such assumptions form the basis for the formulation of certain working hypothesis. A hypothesis is "a tentative assumption made in order to draw out and test its logical or empirical consequences. There may be more than one or several hypotheses in the same study. As these hypothesis are predictions, they are serving as guidelines for the research. So they have to be formulated before the data are collected. The hypothesis is never proved, but it is always tested. So the data collected may or may nor support the hypothesis. A hypothesis may be useful whether it is supported by the data or not. The negation or rejection of a hypothesis is also equally important.

However, it must be noted that the hypothesis should be very specific and limited to the problem concerned. It should not be too broad generalizations. The hypothesis should show relationships among the different variables in the study. It should be stated in clear and concise language. The hypothesis puts the researcher on the right path and sharpens the thinking and focusses attention on more important aspects of the problem studied. The working hypothesis also indicates the nature of data and methods of analysis required for the study. But it should be noted that some types of research may not require a hypothesis as in the case of numerical estimations. However, as a general rule a working hypothesis is always useful to the research of all kinds.

6. Preparing the research design

The researcher will be required to prepare a research design, i.e., he will have to state the conceptual structure within which research would be conducted. The preparation of such a design facilitates research to be as efficient as possible yielding maximum information. In other words, the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. But how all these can be achieved depends mainly on the research purpose.

The preparation of the research design, appropriate for a particular research problem, involves usually the consideration of the following:

1. the means of obtaining the information,
2. the availability and skills of the researcher and his staff,
3. explanation of the way in which selected means of obtaining information will be organised and the reasoning leading to the selection.
4. the time available for a research, and
5. the cost factor relating to research i.e., the finance for the purpose.

7. Determine the sample design

The next step in a research process is to determine its sample design. The factors of time and cost are usually important considerations in social research. It is more economical and efficient to base studies on samples rather than to study the universe. Instead of study-

ing every case which might be included in an investigation logically, only a small portion is selected for analysis. From this analysis, useful conclusions which are equally applicable to the universe can be drawn. Great care is to be taken in drawing sample from the universe. The sample should be closely representative of the universe. The size of the sample is no guarantee of its representativeness. Relatively small samples properly selected may be much more reliable than large samples improperly selected Statistician Margret Hagood suggests the following criteria as a guide in the choice of a sample.

1. The sample must represent the universe, (that is, it must be unbiased)
2. The sample must be of adequate size to produce reliable results (that is as measured in terms of specific range of error)
3. The sample must be designed in such a way as to be efficient.

8. Collection of data

In dealing with any real life problem it is often found that data at hand are inadequate, and hence, it becomes necessary to collect data that are appropriate. There are several ways of collecting the appropriate data which differ considerably in context of money costs, time and other resources at the disposal of the researcher.

Primary data can be collected either through experiment or through survey. If the researcher conducts an experiment, he observes some quantitative measurements, or the data, with the help of which he examines the truth contained in his hypothesis.

But in the case of a survey, data can be collected by any one or more of the following ways:

1. By observation
2. Through personal interviews
3. Through telephone interviews
4. By mailing of questionnaries
5. Through schedules

The researcher should select one of these methods for collecting the data taking into consideration the nature of investigation, objective and scope of the inquiry, financial resources, available time and the desired degree of accuracy.

If reliable data are readily available a researcher should make use of them. In India the following are some of the important agencies which collect numerous types of data.

1. Director General of Commercial Intelligence, Calcutta.
2. Labour Bureau, Simla.
3. Registrar General of Census Operation, New Delhi.
4. Reserve Bank of India, Bombay.
5. Planning Commission, New Delhi.
6. Office of the Economic Adviser, Government of India, New Delhi.
7. Central Statistical Organization, New Delhi.
8. Cabinet Secretarial, New Delhi.

9. Director of Economic and Statistics, New Delhi.
10. National Income Unit, New Delhi.

). Analysis of the Data

After the data have been collected, the next step is to process the collected data. Processing of data comprised of editing, coding, categorisation, and tabulation. After tabulation the data should be analysed. Analysis of data means studying the tabulated materials in order to determine inherent facts or meanings. Then interpretations can be made. Through interpretation the meanings and implications of the study become clear.

10. Hypothesis testing

After analysing the data the researcher must test the hypothesis. But a hypothesis seldom comes out to be unequivocally true. So, it is always better for a researcher to try to disprove its negation. The hypothesis perform three functions. Firstly, it is helpful to test theories, Secondly, to suggest theories and thirdly to describe social phenomena. There are various tools for testing of hypothesis such as statistical methods, mathematical methods, operations research, experimental methods, econometric methods and so on. The technique to be chosed for a specific type of research depends upon the convenience, the availability of data, exposure to various methods etc.

11. Generalisation and interpretation

If a hypothesis is tested and upheld several times, it may be possible for the researcher to arrive at generalisation, i.e., to build a theory. As a matter of fact, the real value of research lies in its ability to arrive 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. The process of interpretation may quite often trigger off new questions which in turn may lead to further researches.

12. Preparation of the report

The last step in research is to state the results or to write down the conclusions arrived. The basic purpose of a thesis or research report is to communicate to others the nature of the problem studied, the design and methodology used and the results and conclusions arrived. A thesis or a report should be divided into parts, chapters, section for easy reference. This will also help the researcher to organize his materials systematically. A thesis is generally divided into the following sections.

1. Preliminary pages
2. Text of a thesis
3. End matter

The preliminary pages should cover the following aspects

a. Title
b. Acknowledgements
c. Table of contents

d. List of tables
e. List of diagrams

The text of a thesis should deal with:

a. Introduction
b. Review of literature
c. Hypothesis
d. Methodology
e. Presentation of results
f. Conclusions

The end matter must have the following aspects:

a. Bibliography
b. Appendices
c. Index

Prepared by
Prof. C. Jeganathan

CHAPTER-IV
RESEARCH DESIGN

After the selection and formulation of a research problem, the next step is to prepare a research design. Planning is necessary in research like in any other organised effort. A researcher should think and plan about the way in which he should proceed in research work. A plan prepared for this purpose is known as 'Research design'.

Meaning of research design

An architect prepares a blue - print before he approves a construction. An army prepares a strategy before launching an attack. An artist makes a skeleton before he executes his ideas. Any prudent man makes a plan before he undertakes work. So also the researcher makes a plan of his study before he undertakes his work proper. This will enable the researcher to save time and resources. Such a plan of study or blue-print is called a research design or research strategy.

So, a research design should cover the following aspects. 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.

The preparation of the research design appropriate for a particular research problem involved usually the consideration of the following factors:

1. The means of obtaining information
2. The availability and skill of the researcher and his staff, if any
3. Explanation of the way in which selected means of obtaining information will be

organised and the reasoning leading to the selection.

4. The time available for research
5. The cost factor relating to research i.e., the finance available for the purpose.

Definition of research design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

Research design is a catalogue of the various phases and steps relating to the formulation of a research effort. It is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

The preparation of research design has the following advantages :

a. It saves a lot of researcher's time.
b. It directs him to prepare himself for executing the various activities systematically.
c. It enables resource planning procurement in right time.
d. It betters documentation of the activities while the project is in progress.
e. It ensures project time schedule.
f. It instils and builds up confidence in the researcher.
g. It provides satisfaction and sense of success from the beginning to the completion of every stage of the project.

Nature of research design

Research design is not a precise and specific plan like a building plan to be followed without deviations, but rather a series of guideposts to keep one point in the right direction. It is tentative and undergoes modification in the light of actual requirements as the study progress and adds depth to the work. For example, the scope of a study may be narrowed down, when it is found that certain kinds of data are not available.

Preparation of the design

Planning involves deciding things before hand. Therefore, the preparation of a research design or plan involved a careful consideration of the following questions and making appropriate decisions on them:

1. What is the study about?
2. Why is the study made?
3. What is its scope?
4. What are the objectives of this study?
5. What are the propositions to be tested?
6. What are the major concepts to be defined operationally?
7. On the basis of what criteria or measurements are the operational definitions to be made?
8. When or in what area will the study be conducted?

9. What is the reference period of the study?
10. What methodology is to be used?
11. What kinds of data are needed?
12. What are the sources of data?
13. What is the universe from which the sample has to be drawn?
14. What is the sample size?
15. What sampling techniques can be used?
16. What methods are to be adopted for collection of data?
17. What tools are to be used for collecting data?
18. How are the data to be processed?
19. What techniques of analysis are to be adopted?
20. To what target audience is reporting of the finding meant?
21. What is the type of report to be prepared?
22. What is the duration of time required for each stage of the research work?
23. What is the cost involved?

Keeping in view the above stated design decisions, one may split the overall research design into the following parts:

a. The sampling design which deals with the method of selecting items to be observed for the given study.
b. The observational design which related to the conditions under which the observations are to be made.
c. The statistical design which is concerned with the questions of howmany items are to be observed and how the information and data gathered are to be analysed.
d. The operational design which deals with the techniques by which the procedures specified in the sampling, statistical and observational designs can be carried out.

CONTENTS OF A RESEARCH DESIGN OR COMPONENTS OR STEPS IN THE PREPARATION OF RESEARCH DESIGN

The research design should contain the following

1. Title of the study

The first step in the preparation of a research design is to select a title for the research study. On going through the title one must be able to identify the area of study. The title should be as brief as possible. The language of the title should be professional in nature and not pedantic.

2. Introduction

The problem selected for the study may be introduced by making a reference to the subject area to which it relates and the specific aspects selected for study.

3. Statement of the problem

After a brief introduction explaining the genesis of the problem, the design should state the problem. While stating the problem, usuage of clear, simple and concise statement is preferable.

4. Review of earlier literature

It is essential to review all the relevant materials connected with the problem chosen. It is necessary to show how the problem under study relates to previous research studies. It is equally important to show how his work differs from exciting literature. The primary aspects of those studies may be briefly described and the gaps may be pointed out.

5. Scope of the study

The scope of the study depends upon the time and money available, availability of the sample, co-operation of the respondents etc. The scope of the study should be delimited with reference to such aspects as the geographical area to be, covered, reference period, the type of institutions/ respondents to the studies, the issues to be covered etc. The purpose of this demarcation is to make the study manageable in terms of researcher's aims, interest and competence and available techniques, time, finance and facilities.

6. Objectives of the study

The objectives of the research study should be compiled in clear cut terms. The objectives, of course, differ with the nature of studies and goals to be attained. The objectives may be stated as under

To study the extent of...
To identify the factors which influence...
To study the nature of relation between...
and
To identify the causes for... To identify the problems faced by...

7. Hypothesis

Hypothesis is a proposition, condition or principle which is assumed perhaps without belief in order to draw out logical conclusions. Hypothesis is formulated to explain observed facts, conditions, or behaviours and to serve as a guide to the research process. Each hypothesis is individually tested to determine whether it is tenable or not. Hypothesis should be stated in clear, concise and understandable language.

8. Operational definition of concepts

A clear understanding of the terms used in the study is important. Each of the concepts used in the study should be defined in operational terms, relating to the proposed study. An operational definition is different from a verbal definition. Operational definition helps a researcher in identifying the data required. For example, when we say agricultural labourers it ordinarily means a person who works on others farms for wages. But some

workers may work casually, say one day in a week. Some workers may work all the days in a week. A researcher who undertakes a study may get confused as to from whom data may be collected. He may define the term labourers say one who earns not less than 75% of his annual income from agricultural wages.

9. Geographical area to be covered

Under his head the area to be covered by the study is mentioned. The area to be chosen depends on the purpose of the study and time and resources available. The physical boundaries of the area to be specified in the research design.

10. Reference period

The period of the study can be mentioned under the heading. The period may be one year or two or more depending on the nature of the study and availability of data. This will help the researcher to attribute the conclusions to the particular period in question.

11. Methodology

Methodology refers to the ways and means of gathering information. The researcher should first decide the type of information needed to answer the researcher questions, i.e., primary data or secondary data. Next he should know the sources of data, i.e., from whom or from where data can be collected. Lastly he should decide the means by which the data can be collected i.e., by observation or interviews or mailing the schedule.

12. Sampling

When the study involves collection of primary data, from the field, the methods of sampling should be decided. Sampling is the study of a few items from a defined population. For example if data are to be collected from income tax payers, it is not possible to contact all income tax payers. So a sample of 100 income tax payers may be selected and data may be collected. This process is called sampling. Small group is called a sample and the large group which contains the sample is called population. The sample must be representative of the population.

13. Tools for collection of data

The tools to be used for this purpose whether interview schedule / guide or questionnaire or check list, etc. should be stated and each of them should be described. The tools to be used should be appropriate to the methods to be adopted for collection of data.

14. Plan of analysis

After collecting the needed date, it should be analysed. The design should describe how to plan the organisation of the data. He should choose the statistical treatment in advance and make a mention in the design.

15.Chapter Scheme

The research findings should be made available to the readers with varied interest. So a researcher will prepare a report after the research is over. This report is called thesis or

dissertation. The chapter scheme of the report should be prepared.

16. Time budget

The time period required for each stage of work and the total time required for the study may be stated. The time required includes the following :

1. Time to be used for preparing the theoretical background.
2. Time to be used for preparing the data gathering devices such as questionnaire, interview schedule, record sheet, interviewer's manual etc.
3. Time to be used for data collection.
4. Time to be used for processing the data.
5. Time to be used for writing report.

17. Financial budget

Money needed to complete the project may be determined. The budget for the project should include the expenses of stationery, printing, sample selection, field work, mailing, processing, tabulation, preparation of the report and overheads.

RESEARCH DESIGN FOR EXPLORATORY OR FORMULATIVE STUDIES

The exploratory studies have the purpose of formulating 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 on which only little knowledge or information is 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 practical experience associated 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 economizing effort in an enquiry is to review and build upon the work already completed by others. It is essential to review all the relevant materials 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 from the existing literature. In an exploratory study, the focus of review may be on hypothesis that may serve as leads to further investigation. Hypothesis may have been explicitly stated by previous investigators and in the light of their usefulness, it is necessary to consider whether they suggest new hypothesis. In those cases, where hypothesis have not been formulated, the tasks is to review the available material with sensitivity to the hypothesis that may be derived from it. The sensitive descriptions to be found in the works of creative writers are also a fertile ground of hypothesis for a 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 everyday experience of many people are helpful to appreciate the effects of alternative decisions and actions with respect to problems of human relations. Such reservoir of experience has tremendous value to 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 an experience survey is to gather and synthesise such experience in the research work.

3. **The Analysis of Insight Stimulating examples**

In certain relatively unformulated areas, lack of experience to serve as a guide leads only to an intensive study of selected examples. For example, the remarkable theoretical insights of Sigmund Frend were stimulated by the 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 yield few new ideas. Although no simple rules can be established for the selection of the instances to be studied, the experience indicates that for particular problems certain types are more appropriate than for others.

However it is important to note that exploratory studies merely lead to insights or hypothesis, 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 hypothesis 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 of 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 other conditions. 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:

1. Formulating the objectives of the study
2. Defining the population or the universe
3. Selecting the sample
4. Designing the methods of data collection
5. 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 assured effect of the

experimental variable. The validity of the experiment depends on the equivalence between the chosen control group and the chosen experimental group. There are two ways of assuring this equivalences, namely, randomisation and matching.

Conclusion

There are several research designs and the researcher must decide in advance of collection and analysis of data as to which design would prove to be more appropriate to his research project. He must give due weight to various points such as the type of universe and its nature, the objective of his study, the source list or the sampling frame, desired standard of a accuracy and the like when taking a decision the design for the research project.

Prepared B
Prof. C. Jeganathan

CHAPTER-V
HYPOTHESIS

Hypothesis is usually considered as the principle instrument in research. Its main function is to suggest new experiments and observations. In fact, many experiments are carried out with the deliberate object of testing hypothesis.* Decision makers often face situation where in they are interested in testing hypothesis on the basis of available information and then take decision on the basis of such testing. In social science where direct knowledge of population parameter is rare, hypothesis testing is the often used strategy for deciding whether a sample data differ or support for a hypothesis such that generalisation can be made. Thus hypothesis testing enables us to make probability statements about population parameter. The hypothesis may not be proved absolutely but in proactive it is accepted. It is withstood a critical testing.

What is Hypothesis ?

Hypothesis is an assumption or some supposition to be proved or disproved. But for a researcher hypothesis is a formal question to be proved or disproved. Hypothesis is a predictive statement capable of being tested by scientific methods. It relates an independent variable to some dependent variable.

Difference between a theory and hypothesis

A hypothesis is not the same as theory although the two are closely related. According to William H. George, "Theory is elaborate hypothesis. The hypothesis actually emerges from the theory. It is a generalisation drawn from the theory itself and when it has been tested and found correct it becomes a part of the theory itself. Thus theory itself in its early form is only hypothesis and the two are interdependent. There is only difference in degree and form. Hypothesis is a stage that precedes formulation of theory. According to Pauline Young "Provisional central idea which becomes the basis for fruitful investigation is known as working theory".

Definition

George A. Lundberg, "A hypothesis is a tentative generalisation the validity of which remains to be tested. In its most elementary state the hypothesis may be very much guess, imaginative data, which becomes the basis for action or investigation".

Webster, "A hypothesis is a preposition, condition or principle which is assumed, perhaps without belief, in order to draw out its logical consequences and by this methods to test its accord with facts which are known or may be determined.

Goode and Hatt have defined it as "a proposition which can be put to test to determine validity".

Rummerl and Ballaine say, "Hypothesis is a statement capable of being tested and thereby verified or rejected".

According to M.H. Gopal, "It has been defined as a tentative solution posed on a cursory observation of known and available data and adopted provisionally to explain certain events and to guide in the investigation of others. It is, in fact, a possible solution to the problem.

A hypothesis is a provisional formulation or possible solution or tentative explanation or suggested answers to the problem facing the scientist. A hypothesis, therefore, is essentially tentative, likely to be modified during the investigation if the facts discovered in the course of the enquiry demand it. It is an explanation that needs to be established before it can be accepted.

Characteristics of hypothesis

Hypothesis must possess the following characteristics:

1. Hypothesis should be clear and precise. If the hypothesis is not clear and precise, the inferences drawn on its basis cannot be taken as reliable.
2. Hypothesis should be capable of being tested. In a swamp of untestable hypothesis, many a time the research programmes have bogged down. Some prior study may be done by researcher in order to make hypothesis a testable one. A hypothesis "is testable if other deductions can be made from it which, in turn, can be confirmed or disproved by observation.
3. Hypothesis should state relationship of variables, if it happens to be a relational hypothesis.
4. Hypothesis should be limited in scope and must be specific. A researcher must remember that narrower hypothesis are generally more testable and he should develop such hypothesis.
5. Hypothesis should be stated as far as possible in most simple terms so that the same is easily understandable by all concerned. But one must remember that simplicity of hypothesis has nothing to do with its significance.

6. Hypothesis should be consistent with most known facts i.e., it must be consistent with a substantial body of established facts. In other words, it should be one which judges accept as being the most likely.
7. Hypothesis should be amenable to testing within a reasonable time. One should not use even an excellent hypothesis, if the same cannot be tested in reasonable time for one cannot spend a life time collecting data to test it.
8. Hypothesis must explain the facts that gave rise to the need for explanation. This means that by using the hypothesis plus other known and accepted generalizations, one should be able to deduce the original problem condition. Thus hypothesis must actually explain what it claims to explain, it should have empirical reference.

FUNCTIONS OF HYPOTHESIS

The functions of hypothesis are threefold. They are (i) to test theories, (ii) to suggest theories and (iii) to describe social phenomena.

1. **To test theories:**

The function of the hypothesis is to state a specific relationship between phenomena in such a way that this relationship can be empirically tested. That is, the hypothesis must be empirically demonstrated as either probable or not probable. The theories lend themselves for empirical test only if the facts, proposition and assumptions implied in them are split up into specific hypothesis.

2. **To suggest theories:**

Another function of hypothesis is to suggest theories. According to Goode & Hatt, "Every worthwhile theory permits the formulation of additional hypothesis. These, when tested, are either proved or disproved and in turn constitute further tests of the original theory".

3. **To describe social phenomena:**

When hypothesis are tested, they explain the phenomena associated with them. The phenomena may be totally new or partly known either or not known earlier.

Source of hypothesis

Hypothesis may be developed from various sources. Some of the important sources are the following:

1. A hypothesis arises from intuition. These hypothesis have no clear connection with the larger body of social science.
2. A hypothesis also arises from other studies. The findings of a study may be formulated as hypothesis. The hypothesis followed in one study previously can be used in the present study.

3. Theory is a fertile seed-bed of hypothesis. For example individuals who are arising is status are likely to be favourable inclined towards individuals and objects that are helping their upward movement. The researcher may identify the variables which influence the status of the said individuals.
4. Personal happiness provides scope for hypothesis. The phenomenon of personal happiness has been studied in great detail. Happiness has been correlated with income, education, occupation, social class and so on.

Significance of hypothesis

A researcher cannot take a single step forward in any enquiry unless he begins with a suggested explanation or solution. Collection of facts merely for the sake of collecting them will yield no fruits. Before collecting the data, the researcher has to establish hypothesis. After wards he has to collect facts which are far or against a preposition. Thus hypothesis helps the researcher to decide the kind of data to be collected and the way in which it should be organised more efficiently.

Once the researcher knows what problem is, he can make a guess or number of guesses. The guesses he makes are the hypothesis which either solve the problem or guide him to further investigation. Hypothesis stands somewhat at the midpoint of research. From this midpoint one can look back to the problem and also look forward to the data. If the hypothesis is proved, the solution can be found. If it is not proved, alternate hypothesis is taken to be correct.

A great many social science investigations are concerned with hypothesis. For example psychologists have investigated the correlation between different kinds of abilities. Sociologists have studied the ecology of crime and of mental illness. Anthrolpologists have investigated the relationship between religious beliefs, marriage customs and other practices in a society.

Difficulties in formulation of hypothesis

The task of formulation of hypothesis has certain difficulties as pointed out by Goode & Hatt.

1. Lack of clear theoretical background. Hypothesis do not have a clear cut and definite theoretical background. Because of this weakness, it is not easy to arrive at certain conclusions.
2. Lack of logical background. Hypothesis not only lacks a definite and clear cut background, but also lacks the logical use of the theoretical background. In otherwords it means that there is no logical background.

3. Lack or knowledge of scientific methods. It is always not possible to have complete information of an acquintance with the scientific methods for formulation of hypothesis. This lack of scientific knowledge presents difficulty in formulation of hypothesis.

The following steps have to be taken to remove difficulties with the formulation of hypothesis:

a) Complete and perfect knowledge of the principle of sociology has to be acquired.
b) From the very beginning the hypothesis should be brief and timely.
c) It should grow as the research proceeds further. In other words, it means that hypothesis should become elaborate as one proceeds in the field of research.

Types of hypothesis

1. Null hypothesis
2. Alternate hypothesis.

The null hypothesis is a very useful tool in testing the significance of difference. In its simplest form the hypothesis asserts that there is no true difference in the sample and the population in the particular matter under consideration (hence the word "null" which means invalid, void or amounting to nothing) and that the difference found is accidental, unimportant arising out of fluctuations of sampling. The null hypothesis is akin to the legal principle that a man innocent until he is proved guilty. It constitutes a challenge; and the function of the experiment is to give the facts a chance to refute (or fail to refute) this challenge. For example, if we want to find out whether extra coaching has benefited the students or not, we shall set up a null hypothesis that "extra coaching has not benefited the students. Similarly, if we want to find out whether a particular drug is effective in curing malaria we will take the null hypothesis indicates that the differences are due to chance. Since many practical problems aim at establishment of statistical significance of differences, rejection of the null hypothesis may thus indicate success in statistical project.

As against the null hypothesis, the alternative hypothesis specifies those values that the researcher believes to hold true, and of course, he hopes that the sample data lead o acceptance of this hypothesis as true. The alternative hypothesis may embrace the whole range of value rather than single point. Now-a-days, it is usually accepted common practice not to associate any special meaning to the null or alternative hypothesis but merely to let these terms represent two different assumptions about the population parameter. However, for satistical convenience it will make a difference as to which hypothesis is called the null hypothesis and which is called the alternative.

Prepared by
Prof. C. Jeganathan

Paper X
COLLECTION OF DATA

Input of information is a pre-requisite for any rational decision making. Research is no exception. Whether it is a statistical investigation, or solving a research problem, scientific collection of data with due regard to relevancy, time, cost, accuracy and promptness of the observations being recorded, is to be given due consideration.

Generally sources can be divided into (a) Field (primary) and (b) Documentary (secondary) sources. The fund of knowledge obtained from those people who are in a position to describe not only the existing state of affairs but also observable trends and significant milestones (personal or direct sources) are called primary data. Data from primary sources may be gathered by participant observation, personal interview, conference, correspondence, questionnaire, telephonic conversation, schedule etc.

Documentary sources of information which are contained in the published and unpublished documents, reports, statistics, manuscripts, letters, diaries, memoirs, autobiographies and so on are normally called secondary data. In simple words, this classification is also called as "persons" (primary data) and "paper" (secondary data).

Merits and demerits of data

The description of merits or demerits of any given data is highly subjective. Data, which are highly relevant and useful in one context may prove useless in another context. Hence, due diligence must be exercised in the choice of the kinds of data : The following factors may be considered in the choice of data:

a) Suitability of data
b) Adequacy of data
c) Reliability of data.

However, a study of the distinction between the primary and secondary data would prove helpful in a researcher's decision-making.

Differences between primary and secondary data

1. In primary data information is obtained from the original source. Secondary data is collected from those data which have been obtained by some other researcher.
2. Primary data are originally collected for the project at hand. Whereas, the secondary data are collected for some other project, but are relevant to the project at hand.
3. Information has to be created as primary data. In secondary data, information is already existing.
4. Primary data is fresh and latest. Secondary data are existing, old and the time - log is unavoidable.
5. Primary data are costly and time consuming but to any later projects, as secondary data, they save time, money and effort.

6. Primary data are unpublished and authenticity can be vouched or traced back for correction. Secondary data are published or semi-published usually distanced from the source.

Source of Published Data :

Government departments for documentary sources are : Bureau of Economics and Statistics, Indian Statistical Institute (ISI) Calcutta Archives, Planning Commission, Reserve Bank of India (RBI) Indian Council of Social Science and Research (ICSSR), Federation of Indian Chamber of Commerce,

Methods of collecting primary data

The methods commonly used for the collection of primary data are:

i) Direct personal investigation
ii) Indirect oral interviews,
iii) Information received through local agencies,
iv) Mailed questionnaire method,
v) Schedules sent through enumerators.

i) Direct personal Investigation

This method consists in the collection of data personally by the investigator (organising agency) from the sources concerned. In otherwords, the investigator had to go to the field personally for making enquiries and soliciting information from the informants or respondents. This nature of investigation very much restricts the scope of the enquiry. Obviously this techniques is suited only if the enquiry is intensive rather than extensive. That is, this method should be used only if the investigation is generally local - confined to a single locality, region or area. Such investigations require the personal attention of the investigator; they are not suitable for extensive studies where the scope of investigation is very wide. Obviously information gathered from such investigation is original in nature.

Merits

i) The first hand information obtained by the investigator himself is bound to be more reliable and accurate since the investigator can extract correct information by removing the doubts, if any, in the minds of the respondent regarding certain questions. Incase the investigator suspects the sincerity of respondent(s) he can check it through intelligent cross - questioning.

ii) The data obtained would be generally reliable if the type of enquiry is intensive in nature. It also assumes that time and money do not pose any problems for the investigator.

iii) When the respondents are approached personally by the investigator, the response is likely to be more encouraging, serious and sincere.

iv) Different persons have their own ideas, likes and dislikes and their opinions on some of the questions may be coloured by their own prejudices and vision and as such some of them might react very sharply to certain sensitive questions posed to them. The investigator, being on the spot, can handle such a delicate situations creditably and effectively by ones personal skill, intelligence and insight either by changing the topic or if need be, by explaining to the respondent in polite words the objectives of the survey in detail.

v) The investigator can extract proper information from the respondents by talking to them at their educational level and, if need be, ask them questions in their language of communications and using local annotations, slang, dialect etc. if any, for the words used.

Demerits

i) This type of investigation is restrictive in nature and is suited only for intensive studies and not for extensive enquiries.

ii) This type of investigation is handicapped due to lack of time money and manpower (labour). It is particularly time-consuming since the informants can be approached only at their convenience and in case of working class, this restricts the contact of the investigator with the informants only in the evenings or at the week-ends and consequently the investigation is to be spanned over a long period.

iii) The greatest drawback of this enquiry is that it is absolutely subjective in nature. The success of the investigation largely depends upon the intelligence, skill, tact, insight, diplomacy and courage of the investigator. If the investiator lacks these qualities the results of the enquiry cannot be taken as satisfactory or reliable. Moreover, the personal biases, prejudices and whims of the investigator may, in certain cases, adversely affect the findings of the enquiry.

iv) Further, if the investigator is not intelligent, tactful or skilful enough to understand the psychologies and customs of the audience, the results obtained from such an investigation will not be reliable.

ii) Indirect oral investigation

When the direct personal investigation is not practicable either because of the unwillingness or reluctance of the persons to furnish the requisite information or due to the extensive nature of the enquiry or due to the fact that direct sources of information do not exist or are unreliable, an indirect oral investigation is carried out. For examples, if we want to solicit information on certain social evils like if a person is addicted to drinking, gambling or smoking etc, the persons will be reluctant to furnish correct information or they

may give wrong information, The information on the gambling, drinking or smoking habits of an individual can best be obtained by interviewing his personal friends, relatives or neighbours who knew him thoroughly well. In these types of enquires factual data on different problems are collected by interviewing persons who are directly or indirectly concerned with the subject - matter of the enquiry and who are in possession of the requisite information. This method consists of collection of the data through enumerators appointed for this purpose. A small list of questions pertaining to the subject matter of the enquiry is prepared. These questions are then put the persons, known as witnesses or informants, who are in possession of such informat on and their replies are recorded. Such a procedure for the collection of factual data on different problems is usually adopted by the Enquiry Committees or Commissions appointed by the government - State or Central.

Merits

i) Since the enumerators contact the informants personally, they can exercise their intelligence, skill, tact, etc. to extract correct and relevant information by cross - examination of the informants, if necessary.

ii) As compared with the method of "direct personal investigation", this method is less expensive and requires less time for conducting the enquiry.

iii) If necessary, the expert views and suggestions of the specialists on the given problem can be obtained in order to formulate and conduct the enquiry more effectively and efficiently.

Demerits

i) Due to lack of direct supervision and personal touch the investigator (sponsoring agency) has to rely entirely on the information supplied by the enumerators. The success of the methods lies in the intelligence, skill, insight and efficiency of the enumerators and also on the fact that they are honest persons with high integrity and without any selfish motives. Enumerators must be properly trained and tactful enough to elicit proper and correct responses from the informants. Moreover, personal biases due to the prejudices, and whims of the enumerators should not be allowed enter or, at least, they must be minimised.

ii) The accuracy of the data collected and the inferences drawn, depend to a large extent on the nature and quality of the witnesses from whom the information is obtained. A wrong and improper choice of the witnesses will give biased - results which may adversely affect the findings of the enquiry. It is, therefore, imperative :

   a) To ascertain the reliability and integrity of the persons (witnesses) selected for interrogation. In other words, it should be ascertained that the witnesses are mature, unbiased persons without any selfish motives.

b) That the findings of the enquiry are not based on the information supplied by a single person alone. Rather, a sufficient number of persons should be interviewed to find out the real position.
c) That the witnesses really possess the knowledge about the problem under study that is, they are in a position to give a clear, detailed and correct account of the problem.
d) That a proper allowance about the pessimism or optimism of the witnesses depending upon their inherent psychology should be made.

iii) Information Received through Local Agencies

In this method the information is not collected formally by the investigator or the enumerators. This method consists in the appointment of local agents (commonly called correspondents) by the investigator in different parts of field of enquiry. These correspondents or agencies in different regions collect the information according to their own ways, fashions, liking and decisions and then submit their reports periodically to the Central or Head Office where the data are processed for final analysis. This technique of data collection is usually employed by newspaper or periodical agencies who require information in different fields like sports, riots strikes, accidents, economic trends, business, stock and share market, politics and so on. This method is also used by the various departments of the government (State or Central) where the information is desired periodically (at regular intervals of time) from a wide area. This method is particularly useful in obtaining the estimates of agricultural crops which may be submitted to the government by the village school teachers. A more refined, the sophisticated way of the use of this technique is the registration method in which any event, say, birth, death, incidence of disease etc., is to be reported to the appropriate authority appointed by the government like Sarpanch or Patwari in the village or Block Development Officers (B.D.O.'s), civil hospitals or the health departments in the district headquarters etc., as and when or immediately after it occurs. Vital statistics i.e., the data relating to mortality (deaths) and fertility (births) are usually collected in India through the registration technique.

Merits

This method works out to be very cheap and economical for extensive investigations particularly if the data are obtained through part-time correspondents or agents. Moreover, the required information can be obtained expeditiously since only rough estimates are required.

Demerits

Since the different correspondents collect the information in their own fashion and

style, the results are bound to be biased due to the personal prejudices of the correspondents and consequently the data so obtained will not be very consistent and reliable. Hence this technique is suited if the purpose of investigation is to obtain rough and approximate estimates only and where a high degree of accuracy is not obligatory

This registration method suffers from the drawback that many persons do not report and neglect to register which usually results in underestimation. For an effective and efficient system or registration there should be legal compulsion for registration of events and accompanying sanctions for the enforcement of this obligation.

4. Mailed questionnaire method

This method consists in preparing a questionnaire (a list of questions relating to the field of inquiry and providing space for the answers to be filled by the respondents) which is mailed to the respondents with a request for quick response within the specified time. A very polite covering note, with details of aims and objectives of collecting the information and also the operational definitions of various terms and concepts used in the questionnaire is attached. Respondents are also requested to extend their full co-operation by furnishing the correct replies and returning the questionnaire duly filled, in time

Respondents are also taken into confidence by ensuring them that the information supplied by them in the questionnaire would be kept 'strictly confidential'. In order to ensure quick and better response the return postage expenses are usually paid by the investigator through Self-Addressed Stamped Envelope (SASE). This method is usually used by the research workers, private individuals, non - official agencies and sometimes even by government.

The most important factor for the success of the 'mailed questionnaire method' is the skill, efficiency, care and the wisdom with which the questionnaire is framed. The questions asked should be clear, brief, corroborative, non-offending courteous (in tone), unambiguous and to-the-point, so that not much scope of guessing is left on the part of the respondent. Moreover, while framing the questions the knowledge, understanding and the general educational level of the respondents should be taken into consideration.

Merits

i) Of all the methods of collecting information, the mailed questionnaire method is by far the most economical method in terms of time, money and manpower (labour) provided the respondents are prompt and the response is total.

ii) This method is used for extensive enquiries covering a very wide area.

iii) Errors due to the personnal biases of the investigators or enumerators are completely eliminated as the information is supplied directly by the person concerned, in own handwriting. The information so obtained is original and much more authentic.

Demerits

i) The most serious drawback of this method is that it can be used effectively with advantage only if the respondents are educated (literate) and can understand the questions well and reply them in their own handwriting.

ii) Quite often people might suppress correct information. Hence this method suffers from the low degree of reliability of the information supplied by the respondents.

iii) Another limitation of this method is the hesitancy of informants to give written information in their own handwriting on certain personal questions like income, property, personal habits and so on.

iv) Since the questionnaires are filled by the respondents personally there is no scope for asking supplementary questions for cross - checking of the information supplied by them. Moreover the doubts in the minds of the informants, if any, on certain questions cannot be dispelled.

v) Schedules sent through enumerators

While questionnaire is a list of questions which are answered by the respondent, a schedule is the device of obtaining answers to the questions in a form which is filled by the interviewers or enumerators (the field agents who administer these questions) in a face-to-face- situation with the respondents. The most widely used method of collection of primary data is the 'schedules sent through the enumerators'. In this method the enumerators go to the respondents personally with the schedule (list of questions), ask them the questions therein and record their replies.

Merits

i) The enumerators can explain in detail the objectives and aims of the enquiry to the informants and impress upon them the need and utility of furnishing the correct information. Being on the spot, the enumerators can dispel the doubts, if any.

ii) This technique is very useful in extensive enquiries and generally yields fairly dependable and reliable results due to the fact that the information is recorded by highly - trained and educated enumerators.

iii) Unlike the mailed - questionnaire method, this technique can be used with advantage even if the respondents are illiterates.

iv) In direct personal investigation due to personal likes and dislikes, different people react differently to different questions and the enumerators, by their skill fact, wisdom and calibre can handle the situation very effectively by changing of discussion.

Demerits

i) It is fairly expensive method since the team of enumerators is to be paid for their services.

ii) It is also more time - consuming as compared to the mailed questionnaire method.

iii) Due to inherent variation in the individual personalities of the enumerators there is bound to be variation, though not so obvious in the information recorded by different enumerators. An attempt should be made to minimise this variation.

iv) The success of this method also lies to a great extent on the efficiency and wisdom with which the schedule is prepared or drafted.

Interview

Interview is one of the important methods used most commonly in the study of human behaviour. It is a direct method of data collection. The person who is interviewing is called interviewer and the person who is interviewed is called interviewee or respondent.

Definition

Pauline V. Young defines interview as "an effective, informal, verbal and non-verbal conversation, initiated for specific purpose and focused on certain planned content areas".

According to Emory, "personal interviewing is a two - way purposeful conversation initiated by an interviewer to obtain information that is relevant to some research purpose". Interviewing is not a simple two way conversation between an interrogator and informant. It is an interactional process. It is a mutual view of each other.

Objectives of Interview

The following are the major objectives of interview:

1. To gather data extensively and intensively.
2. To measure the personality of the respondents.
3. To move freely with the respondents and to study their reactions to particular question.
4. To exchange ideas and experience.
5. To elicit information pertaining to wide range of data.
6. To obtain life-history data, that is, an in time full account of a person's experience attitude and values of one's entire life cycle.

Type of interview

Interviews may be classified in various ways - according to their function, or according to number of persons participating or length of contact or type of approach.

According to their functions, interviews may be classified into diagnostic, treatment, research and sampling interviews.

According to number of persons participating, interviews may be grouped into two types viz; group Interview, Individual interview.

According to the length of contact, interviews may be classified into two categories viz ; short contact interview and long contact interview.

One the basis of type of approach, interviews may be grouped into structured interview (directive interview) and unstructured interview (non - directive).

Directive Interview

This type of interview is also designated as controlled or guided or structured. This interview uses a highly standardised technique and a set of pre-determined questions. It is especially useful for administrative and market research of various types.

Non - Directive Interview

This type of interview is also known as uncontrolled, unguided or unstructured. In this type of interview, the interviewer does not follow a system or list of predetermined question. Interviewers are encouraged to relate concrete experiences with no or little direction from interviewer. Non - directive interviews are generally used in the following type of enquiries:

1. When pilot studies are undertaken in order to get an idea of the phenomena under study.
2. To study the reactions and feelings of the respondents pertaining to some emotional incident.

Focussed interview

The main function of this type of interview is to focus attention on the given experience of the respondent and its effects. It proceeds on the basis on an interview guide which outlined the major areas of the inquiry. Thus interviewer knows in advance the aspects of a question he has to cover. In such interview, although the respondent is free to express completely his own line of thought, the direction of the interview is mainly in the hands of the interviewer. This type of interview is focused on the subjective experiences, - attitudes and emotional responses regarding the particular concrete situation under study. This method has been applied by R.K. Merton for studying the psychological effect of radio, cinema television, etc. on the public.

Repeated interview

This type of interview is used to study the gradual influence of some social or

psychological process, that is the progressive actions, factors or attitudes which determine a given behaviour pattern or social situation. Thus for example, a village is linked with some road connecting it with the city, naturally it will have its own influence upon the life of the people. There will be a gradual change in economic status, standard this influence in time sequence, a study has to be conducted at regular intervals to mark the general change taking place.

The repeated interview technique is expensive in time, energy and money, but it ensures the advantage of studying the progressive actions and events as they actually occur.

Depth interview

Depth interview deliberately aims to elicit unconscious as well as other types of material relating to personality dynamics and motivations. It is generally a lengthy procedure designed to encourage free expression. This interview can reveal important aspects of psychosocial situation which are otherwise not readily available. Depth interview requires great skill and specialised training on the part of the interviewer and at the same time takes considerable time.

PROCESS OF INTERVIEW

Interviewing is an art. No hard and fast rules can be given for conducting an interview. However, the following steps would act as a guideline for the interviewers :

1) Planning and Preparation

Careful planning and meticulous preparation are necessary to make an interview successful. If the interview is to be structured interview schedule must be ready and in the case of unstructured interview, interview guide must be at the disposal of the interviewer. A definite time and place should be set for the interview. The interviewer must know what he wants and should take proper introduction or recommendation letters. The interviewer may contact the leaders of the village or community to get the co-operation of the respondents.

2) Starting the Interview (Rapport)

Before starting the interview, the interviewer should explain the purpose of conducting the interview. The respondent is entitled to know why he is being interviewed. The interviewer has to create a good rapport with the respondent. Rapport involves something more than more friendliness. While creating rapport, the interviewer should be honest; should not exaggerate the benefits of the survey; and, should not give false promise. The interviewer should also inform the confidential nature of the data to be collected.

3) Administering the Questions

In the case of structured type, the interviewer must ask the questions exactly as it is worded. The question should be asked in the pre - determined sequence.

The rules listed below can be observed while asking the questions.

a) Begin with pleasant topics.

b) Ask questions at first that will not provoke any form of negativism.
c) Start with emotionally natural topics.
d) Be straight forward rather man shrewd or clever.
e) Ask only one question at a time.
f) Focus the interviewer's attention on the question and make sure that she / he understands what is wanted.
g) Listen, give a chance to talk, let him/her tell his/her story.
h) Observe the behaviour, facial expressions, tones of voice and other indirect responses
i) Allow enough time to answer each question.
j) If unusual facts are revealed, do not get surprised, shock or emotional tension at the disclosures.
k) Avoid taking the role of a teacher.
l) Do not embarrass the interviewer unnecessarily and
m) Be a critical and intelligent questioner.

4) Eliciting Complete Response

It is very difficult to obtain clear and complete response to a question. Respondents may simply respond: 'Don't know' - to questions in order to avoid thinking or to erase real answers. Interviewees may misunderstand the questions and may give wrong answers. Therefore, the inter-viewer should be altert to all such situations and must elicit complete and correct answers.

According to Kahn and Cannel, inadequate responses may be grouped into five.

a) Partial response:

It may be relevant but incomplete answer.

b) Non - response:

The respondent remains silent or refuses to answer the question.

c) Irrelevant response:

The respondent does not answer the question asked, but speaks something else.

d) Inaccurate response:

The answer is biased or distorted.

e) Verbalised response:

It takes place; perhaps, because the respondent fails to understand it, because he lacks in the information necessary for answering it, or because he thinks it is irrelevant or inappropriate.

Recording the Interview

This is a difficult task particularly in the case of unstructured interview. The recorder should use the exact words of the respondents. Further, the answers relating to pre-coded questions and openended questions should be recorded differently.

While recording the responses errors (problems) may arise due to the following:

a) Due to extensive travel.
b) Due to repetitive administration of lengthy questionnaires.
c) Psychological upset caused by non-co-operative respondents.
d) Simultaneous operation of asking questions, recording, verifying the correctness and preparing for asking next question.

In order to avoid the errors, mechanical aids like tape recorders can be used. Open - ended questions must be recorded immediately.

Closing the interview

Before closing, the interviewer must check whether all the information needed are collected, closing must be natural; not in a hurry. After closing the interview, conversation other than the interview subject could be engaged but it should not lead to controversy. Finally, thanks should be expressed for the respondent's generosity in giving ones time and attention.

Merits of the interview

1. It is the method best-suited for the assessment of personal qualities such as emotions, opinions, reactions and the like.
2. It is of definite value in diagnosing and treating emotional problems.
3. It is of great use in counselling.
4. It is supplementary to other techniques. A combination of interviewing, observational and statistical techniques would often yield the best results.
5. It may be used together with observation to verify information obtained through correspondence method.
6. A highly flexible tool in the hands of skillful interviewer where the interviewer can alter questions to fit the situation.
7. Largest quantity of information for each interview can be obtained.
8. Helps to ascertain the socio - economic characteristics of the respondents.
9. The rate of refusal or non-response is low when compared with correspondence method.
10. A statistically sound sample is easily obtainable with personal interviews.
11. It can be used to collect information on events at the time when they are happening, for example, Radio and Television listening are often checked in this manner.
12. Useful to collect information from illiterate persons.
13. Enables us to study even the past phenomena.
14. Enables the study of an event in its emotional and historical background.

Limitations

1. It takes a good deal of time and energy and may also be expensive for the researcher.
2. Its success dependent upon the interviewer's willingness to report and ability to report

correctly.

3. It is influenced by stresses, strains and other factors affecting either the interviewer the interviewee or both.
4. It is influenced by the emotional "set" of the interviewer - by his self concern or self-pity, his ways to please or antagonise the interviewer.
5. In case of personal questions the answers may not be accurate.
6. Subjection to the biases of the interviewer is inevitable.

QUESTIONNAIRE

The term 'Questionnaire' in general, refers to a device or tool for securing answers to questions by using a form which a respondent fills in himself. According Begardus, it is a list of questions sent to a number of persons for their answers and which obtains standardised results that can be tabulated and treated statistically.

The information sought by the questionnaire may be classified into the following three hand

1. Identifying information
2. Social background and factual data
3. Subject -matter of the survey

Questionnaire Design

The task of composing a questionnaire is both an art and a science. Much caution and imagination are to be put in by the designers of a questionnaire. There are eight steps in designing a questionnaire:

1. Determination of the data to be collected in specific terms.
2. Determination of the interviewing process.
3. Evaluation of the question content.
4. Decision on the format.
5. Clear wording of the questions.
6. Determination of the structure of questionnaire.
7. Determination of die physical characteristics of the form.
8. Pretesting, , revising, final drafting.

STEP 1

Determination of the data to be collected

In this step, the following essential documents for developing a good questionnaire shall be prepared and considered:

a) a statement of research purpose
b) a list of the information to be measured
c) a draft of an analysis plan

STEP 2

Determination of the Interviewing Process

Interviewing process should be decided in advance. The medium to be used for communicating with the respondent falls into the following categories:

a) Personal b) Telephone and c) Mail

The decision is based on two key elements: i) The type of information sought and ii) The respondent-accessibility& availability.

STEP 3

Evaluation of the Question Content

The potential research questions must be evaluated to determine whether they can provide meaningful data. This evaluation can be carried out by considering the following criteria:

i) Does the respondent understand the question?

ii) Does the respondent have the necessary information to answer the question?

iii) will the respondent provide the necessary information? The above questions must be answered affirmatively.

STEP 4.

Decision on the Format

The format of questions is decided on the basis of the responses required. The researcher has to frame questions by assuming himself / herself as a respondent. Questions may be of two types.

i) Close - ended Questions:

The response for these questions will be within the limits provided by the interviewer

ii) Open - ended Questions:

There is no limit provided for the response of the respondent with freedom to give views lengthily.

STEP 5

Clear - wording of the Question

The researcher talks directly with the respondent through the questionnaire for which it is important to get effective results through particular wordings. In order to avoid the common mistakes in the wording of questions the following guidelines will have to be considered:

1. Simple language
2. Familiar vocabulary
3. Short questions

4. Specific questions
5. Avoidance of double- barrelled questions
6. Avoidance of leading questions
7. Avoidance of loaded questions
8. Absence of estimates

STEP 6

Determination of the structure of questionnaire

After determining the set of questions, they can be laid down in a proper sequence in order to impress the respondent and extract adequate responses. This can be pictured as a 'flowerpot' as given below.

1. **LEAD IN QUESTIONS :**

   Starts the flow of responses and gains support.

2. **QUALIFYING QUESTIONS :**

   To find out whether a person is the right type to provide the needed information.

3. **WARM-UP QUESTIONS:**

   To direct thinking and memory.

4. **SPECIFIES ON THE FEELINGS :**

   Or information sought by the study.

5. **DEMOGRAPHIC QUESTIONS :**

   To describe the person who responded and thank for co-operation, breadth of questions

STEP 7

Determination of physical characteristics of the form

The following are the guidelines for designing the physical characteristics of a questionnaire :

i) It should be neat and attractive to secure co-operation of the respondent.

ii) Necessary and brief instructions should be given of appropriate places in the questionnaire.

iii) For open ended questions, enough and adequate space should be provided to record the answers by the respondent.

iv) The instructions should be made crystal clear for the respondents action in the case of skip -pattern questions.

STEP 8

Pre-testing, revising and final drafting

Pre-testing is an accurate miniature of the planned study using a small sample. It may reveal obscure intent under wrong order of questions, awkward expressions, leading questions and weak stimulations of response among the other questionnaire's faults. Guidelines

for designing a good questionnaire

While drafting a questionnaire the following points shall be considered:

1. The questionnaire intimately aim the ultimate objective of investigation.
2. The questionnaire should be brief.
3. Questions outside the respondent's experience should not be asked.
4. Regarding past events, too much reliance should not be placed on the respondent's memory.
5. Questions should be simple, clear and unambiguous and as direct as possible.
6. Proper wording should be used in questions.
7. The structure of the question should be according to the form in which the responses are to be recorded.
8. The questions should be such that the answers are known to the respondents.
9. Questions capable of objective answers are to be entered.
10. Questions affecting pride and sentiments of the people should be avoided.
11. Questions on "sin, morality, patriotism, punishment" etc. should be dropped.
12. Logical sequence of questions is basic to a questionnaire.
13. Insertion of cross - checking questions is desirable.
14. A mailed - questionnaire should always be accompanied by a covering letter and of feasible complements for prompt response and compliance.
15. If a questionnaire is to be translated for use into several local dialects, the translated version should be retranslated into original language to check its fidelity.
16. Inclusion of a final question in the form of thanks giving request to evaluate the questionnaire and to suggest improvements is desirable.

Functions of questionnaire

A questionnaire is simply a formalized schedule to obtain and record specified and relevant information with tolerable accuracy and completeness. It also directs the questioning process and promotes clear and proper recording. The five functions of questionnaires related to the respondent (interviewer) are:

1. Give the respondent clear comprehension of the questions.
2. Induce the respondents with the 'need' to co-operate and 'trust' that answers will be treated confidentially.
3. Stimulate responses through greater introspection than plumbing of memory or reference to records.
4. Give instructions on what is wanted and the manner responding.
5. Identify what needs to be known to classify and verify information.

Scope of the questionnaire method

The questionnaire method of collecting data has become a very popular method. All

observational methods are less effective in giving information about personal beliefs, feelings, motivation explanations or future plans. They do not provide information on person's past or his private behaviour since inherently such behaviour is beyond the preview of observation. The questionnaire method is eminently suited to obtaining such information.

Limitations of a questionnaire

1. The rate of response is not always certain.
2. It is not always economical.
3. The dependability of a questionnaire is determined by the mortality rate also.
4. A questionnaire need not always necessarily respresent the whole population.
5. Mailed - questionnaires suffer from lack of opportunity for further clarrification.
6. Questionnaires will serve light subjects. Problems requiring deep thought can not be handled.
7. The questionnaire takes into consideration the respondents but not their environment (which is also equally important)
8. It is a very difficult task to design an ideal questionnaire, suitable to people of different moods, cultures, sentiments and temperaments.

OBSERVATION

As Oxford Concise Dictionary explains observation a "Accurate watching, noting of phenomena as they occur in nature with regard to cause and effect or mutual relations". Moreover it is systematic and deliberate.

TYPES OF OBSERVATION

1. Simple or uncontrolled observation
2. Systematic or controlled observation
3. Mass observation

1) Simple or uncontrolled observation

In uncontrolled observation no attempt is made to control, manipulate or influence the observed subject matter. (The use of the eyes rather than of the ears and the voice is used in scrutinizing collective behaviour). The data collected by any two observers cannot be compared since each is unique, own and original.

Kinds of uncontrolled observation

a) Participant observation
b) Non-participant observation
c) Quasi-participant observation

a) Participant Observation:

In this kind of observation, the researcher lives as a member of the group she/he wants to study. The success of this method depends on two factors. First, the investigator must have the skill to gain the confidence of the persons being studied so that the presence

does not disrupt or in any way interfere with the natural course of events and they provide him/her with honest answers to his questions and do not hide or conceal important activities. The investigator should also have the ability to prevent personal preconceptions from distorting the observations and interpretations.

Advantages

1. Observe occurrence in the natural settings.
2. Greater objectivity.
3. Every detail and significance of the occurrence can be observed and recorded.
4. Natural behaviour can be observed.
5. Easy access to data.
6. Greater depth of experience
7. Greater range of data.

Disadvantages

1. Observer may get involved in the life of one or the other section of the community only.
2. It narrows the range of experience.
3. The experience becomes unique and hence others cannot repeat it.
4. Less standardization of data.
5. Emotional participation kills objectivity and interferes in interpretation.

b) Non-participant Observation:

In this observation the investigator watches the events and activities from a distance, passively, and makes no effort to either influence or take part in the events and activities observed. For example, a researcher cannot become a criminal in order to study a criminal gang or a female social scientist cannot become a prostitute in order to study prostitution.

MERITS

1) Objectivity and neutrality

An observer in a non-participant observation is too remote from the actual happenings and hence can watch them with a scientific objectivity, not easily attainable in participant observation.

2) Gain of respect and co-operation of the group

In certain situations, for example, communal disharmony an observer can gain real respect and co-operation of group by not participating in any actual happenings.

3) Advantages of being new

It is observed in many situations that people are reluctant to discuss their problems with familiar persons. But they easily reveal their inner feelings and thoughts to strangers.

4) Capability, Neutrality and Sensitivity Demerits

1. Both the observer and the group feel uncomfortable.

2. The behaviour of the observants will become artificial.
3. One has to wait for occurrence.
4. Possible to miss many occurrences if things, happen in the absence.
5. People may feel more suspicious.
6. She/he fails to appreciate the significance of actions.

c) Quasi-participant observation :

Purely non-participant observation is difficult. In the absence of any standard set of relationships or role patterns for the outsider who is always present but never participating, both the group and the outsider are likely to feel uncomfortable. Therefore in many social surveys quasi -participant observation method is preferred. In this method, the observer assumes several roles, sometimes in the role of a participant, such as games and dances. At other times, as an interviewer, stanger or a listener making it clear to the group that the purpose is to gather facts.

2) Systematic or Controlled Observation

The observer's bias is the crucial weakness of uncontrolled observation. Systematic or controlled observation tries to remove this weakness by using various control techniques ranging from simple testing and scoring devices to elaborate laboratory set ups.

Controlled observation may be carried out both in the natural and contrived situations and in their case those observed may or may not be aware of the observation.

1) The control of the observed

In certain social investigations the subject matter of the observation, i.e., the observed is controlled. For example, the behaviour of children is observed by exposing them to various types of stimuli.

2) The Control of the Observer

According to W.J. Goode and P.K. Hatt, "It is rather difficult to control the object under investigation but the observer must at least put controls on himself/herself.

MERITS

1. Common Method :

The method of observation is common to all social sciences.

2. Simplicity :

As compared with other techniques used by social sciences, observation is by far the simplest. It is quite easy and requires relatively less training.

3. Realistic:

Observation is based on actual and first hand experience. Its data are more realistic than the data of other, indirect techniques.

4. Formulation of hypothesis:

In all social sciences, the method of observation is the basis of formulating hypothesis.

5. Verification:

For verification of a hypothesis one has to depend upon observation. Only by actually seeing the phenomenon can we know the nature of the problem and from a guess about the possible means of resolving it.

6. Greater reliability of conclusions:

The conclusions of observation are more reliable than non - observational conclusions because they are based on first hand perception and can be cross - verified.

LIMITATIONS

1) Some events cannot be object of observation

What a person thinks, the first impression of our advertisement, the character of a customer, etc., and other qualitative aspect may not lend themselves to observation.

2) Observation and observables are neither co-existent nor co-equal

It is not the case that whenever a scientist chooses to observe, all relevant facts and events exhibit themselves. For example, we cannot induce people to quarrel and fight simply to watch their behaviour.

3) Certain things are non - observable

There are many mental and emotional factors which, through causes of social phenomenon are in the nature of things not perceivable and, therefore unobservable.

4) Low reliability of conclusions

The conclusions based on observation are not very reliable, because in observation one has to depend upon human tact and resourcefulness alone. And 'to err is human'.

5) Illusory Observation

Eyes are prone to deception. A shrewd observer knows how to perceive truthfully and avoid pitfalls common to ordinary perception. But most persons are liable to deceptions which characterize visual perception.

6) Self-consciousness in the observed

Dr. Thomas in discussing the limits of observation points out that atmosphere tends to become artificial with the knowledge of being observed.

7) Subjectivity explanation

The defects of subjectivity in the explanation creep in the personal description and elucidation of the observed. Moreover, the observers are liable to be carried away by unreal and extraordinary in the field of their observation.

8) Slow investigation

Valid observation cannot be hurried. Slowness of observation methods leads to dimination of interest among both the observer and the observed.

9) Expensiveness

The technique of observation is very expensive. Moreover in order to reach the ob-

served and establish a rapport with them it requires more money and time.

10) Inadequacy

No complete answer can be obtained by observation alone. Observation must be supplemented by other methods of study.

SCHEDULE

Schedule is a list of questions formulated and presented with the specific purpose of testing an assumption on hypothesis.

Schedule is best suited to the study of a single item thoroughly. Emphasizing this G.A. Lundberg observes, "The schedule is a device for isolating one element at a time, thus intentifying our observation".

Types of schedules

P. V. Young has described four types of schedules. They are:

1. Rating schedules
2. Documents schedules
3. Institutional survey forms or evolutional schedules.
4. Observation schedules.

1) Rating schedules

In the fields of business guidance, psychological research and social research, the rating schedules are used to assess the attitudes, opinions, preferences, inhibitions and other like elements. In these schedules, the value and trend of the above mentioned qualities are measured.

2) Documents schedules

The schedules of this type are used to obtain data regarding written evidence and case histories. In criminology, rating schedules are used to gather data to be found in crime studies, the different kinds of crime, their incidence, the nature of earlier crime and the personal data on criminals like school leaving age, the age at the time of employment, the level of economic and social status and other sundry facts about crime and criminals.

3) Institutional survey forms or evolutional schedules

The form and size of evolutional schedules is determined by the nature and the complexity of the problems of an institution. More complex the problem, bigger will be the size of the schedule.

4) Observation schedules

In these schedules the activities and responses of an individual or a group under specific conditions are recorded. The main purpose of an observation schedule is to verify some information.

Collection of data and the decisions connected therewith while offering crucial role for decision-making also offers various possibilities and temptations for excessive collec-

tion of data and hesitant censorship over them. This phase in any research may force violation of deadline and over - spending of budget. Hence, strict control of each phase and aspect must be the watchword for every researcher.

Prepared by
M. JEZER JEBANESAN

CHAPTER -VI
SAMPLING METHODS AND TECHNIQUES

Sampling

The major aim of science is to provide sound propositions about people or matter, both living and not living. But the social scientist does not actually study or observe every item of interest. Social science research tries to understand a segment of the world called 'population' on the basis of observing a smaller segment (sub-set) called a 'sample'.

A population is the total collection of people (whatever group the investigator wishes to make inferences about), things or events under consideration. In social science research populations are not defined by nature but by rules of membership that are chosen by the researcher. A population in research is very similar to abstract concept of a 'Set' in mathematics viz., a well defined collection of objects.

Samples can be any size and can be selected in a number of different ways. A poor sampling procedure may plague research as severely as any other methodological problem. To constitute an appropriate sample we must know the following.

i) Which cases to be sampled

ii) How many cases should be included in the sample.

Scientists seek to establish the broadest possible generalisation applicable to infinitely large classes of events.

Population - Definition

After determining the units of analysis the first task in sampling, is to determine the population of interest to describe the particular collection of unit that makes a population. Experienced researchers get a clear picture of the population before selecting the sample. Defining the population is a two step process, i) Clearly identify the target population, ii) the population to which the researcher would like to generalise his or her research. To define target population one must keep in mind.

a) The scope of the planned generalisation.

b) The practical requirements of drawing a sample.

The relevant criteria for defining target population depend on the type of unit and

research topic. A good definition of the target population clearly indicate who is to be included and who is to be excluded e.g. In a national fertility study in which it is important to identify married woman of child - bearing age. ii) when the target population is clearly defined the researcher must find a way for making it operational. This involved construction of sampling frame. The sampling frame denotes the set of all cases from which sample is to be selected. It's the operational definition that provides basis for sampling. There are two ways of constructing a sampling frame.

a) Listing all cases / items.

b) Providing a rule, defining membership, e.g. Telephone directory inferences could be made only about the population represented by the sampling frame. One should be careful to evaluate the omissions that are made from the target populations. In telephone directories excluding poor who cannot afford telephones and the more wealthy who have many numbers.

ADVANTAGES

1. Economy

The sampling technique is much less expensive, must less time consuming than the census technique.

2. Reliability

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

3. Detailed Study

Since the number of sample units is fairly small these can be studied intensively and elaborately. They can be examined from multiple view points.

4. Scientific Base

This is a scientific technique because the conclusion derived from the study of certain units can be verified from other units. By taking random samples we can determine the amount of deviation from the norm.

5. Greater Suitability in Most Situations

Most of the surveys are made by the technique of sample survey, because wherever the matter is of a homogeneous nature, the examination of few units would suffice. This is the case in the majority of situations.

DISADVANTAGES

1. Less Accuracy

In comparison to census technique the conclusions derived from sample are more likely to error. Therefore sampling technique is less accurate.

2. Changeability of Units

If the units in the field of survey are liable to change or if these are not harmonious the sampling technique will be very hazardous. It is not scientific to extend the conclusions derived from one set of sample to other sets which are unlike or are changeable.

3. Misleading Conclusions

If due care is not taken in the selection of samples or if they are arbitorarily selected, the conclusions derived from them will become misleading if extended to all units.

4. Need for sepcialized knowledge

The sample technique can be successful only if a competent and able scientist makes the selection. If this is done by average scientist, the selection is liable to be wrong.

5. When Sampling is not possible

Under certain circumstances it is very difficult to use the sampling technique. If the time is very short and it is not possible to make selection of the sample, the technique cannot be used. Besides if we need 100% accuracy the sampling technique cannot be used. It can also not be used if the material is of heterogeneous nature.

PLANNING AND DESIGNING THE ENQUIRY

Before the actual collection of data, a well throughout plan has to be prepared, so that money, time and labour may not be wasted over wrong methods. The investigating body must exercise careful consideration on the following aspects:

a. Statement of the problem and scope of the enquiry.
b. Determination of units of data collection.
c. Sources of data and methods of getting data.
d. Choice of frame.
e. Degree of accuracy expected.
f. Costing of the plan.

a) Statement of the Problem and scope of the enquiry

From every field of application the experts will throw the problems in their angle and insist that data related to the problem must be collected through statistical survey. For example, the managing director of a leading Private Limited Company felt that his company has been losing market share and decided to fire his marketing manager if the company's market share has fallen below to take necessary action. It is necessary to define the particular problem at hand in clear terms of/ statistical terminology. . . definition of the objective of the investigation must be stated in clear terms. If the object of enquiry is properly determined and defined many difficulties of the collection and analysis of data are automatically removed. We can increase the efficiency of the survey by 30 percent. This will enable the investigator to determine the factors which are to be included in the survey, so that he may guard against the omission of factors which might be necessary in reaching a solution. It is

also important to exclude the unnecessary factors when their inclusion would lead to waste of time and money.

The nature of information to be collected and the geographical area to be covered for a particular enquiry are interrelated. Therefore, the scope or the coverage of the proposed enquiry must be specifically decided in advance. Where limited information is to be collected, the geographical area may also be correspondingly limited. The investigator will be able to collect the data intensively by studying each and every item of the area. But it must be noted that the larger the coverage of the enquiry, the more representative will the final results be. A time limit for the completion of the enquiry must also be fixed, taking into account the nature of information and the geographical area. If there is any need to extend the enquiry, the period of extension must not be unduly long.

b) Determination of Units of Data Collection

Data are the raw material to which the statistical tools are applied for analysis, much as wood is the raw material for the cabinet-maker or marble the raw material for the sculptor. Before working with their raw material, both the sculptor and the cabinet-maker take great points to study the structure and properties to be sure that it is suited to their purpose. Units applied for data collection provided a definite basic structure to the information.

A statistical unit is the basic unit or entity in enumeration and is decided upon before undertaking the investigation. It may be a place or object or person or any other phenomena which will throw light on the problem. By statistical survey we can collect information through the statistical unit. For example if we want data about the marks or age of students in a class then the statistical unit will be the students. In a market research survey each retail shop can be termed as statistical unit.

If we want to study the problem relating to small scale industry then we can identify the statistical unit as each industry when number of employees are less than 50 during any period. In a family - budget survey each family is termed as statistical unit. Thus statistical unit will differ from other standard units used in physics or chemistry or any other science. The statistical unit can be defined from the object of the problem in hand. The statistical unit must be properly defined in any investigation. Otherwise the analysis of the data will become very difficult.

A satisfactory statistical unit should possess the following qualities: 1) appropriateness, 2) clarity, 3) measurability and 4) comparability. The appropriateness of a unit is determined by the purpose of a study. A unit appropriate for one study may not be so for another. The criterion of clarity implies precision and simplicity of definition. The definition of a

unit should be readily understandable and should possess the same meaning for all people concerned. Satisfactory unit should fulfil the requirements of measurability in the broadest sense of that them.

But on several occasions, the problem of defining a unit becomes difficult. In taking a population census, the unit is one person. This is an easily defined natural unit, and there is not much difficult in deciding what is and what is not a person. Write conducting an enquiry about the size of business units in a particular locality, different known factors such as capital invested, number of workers, trend of sales and level of output etc. may be considered. If it is upon the capital invested and sales, the unit may be the rupee. If it is based on the number of employees, the unit will be "an employee".

c) Classification of Statistical Units

Statistical units can be broadly classified as under.

i) Units of Collection are those which are concerned with counting or measurements of objects. They may be divided into a) simple units and b) composite units. A simple unit expresses a single condition without any qualification. It is not difficult to define as it is in common use. Examples of such units are : a worker, a ton, a bale, a mile, a house, a kilogram, a rupee, a room, a child, a village etc. Simple units are subject to another division also which is based on the origin of the unit. A child and a worker are examples of natural units. These units possess clarity. A bale, a house, a radio, etc. are the products of 'natural resources transformed for human advantage and use'. Hence they are called produced units. Units like 'ton', 'kilogram', 'mile' etc. are fixed arbitrarily and they do not arise naturally. They arise out of measurement and hence they are called measurable units. 'A rupee', 'a dollar', 'a pound', etc. are used for measuring values. These are called pecuniary value units. These are indispensable for measuring production, income, trade etc.

A composite unit is one which is formed by adding a qualifying word to a simple unit as a result of which its scope becomes restricted and the problem of defining it exactly becomes rather difficult. For example, mile is a simple unit and its scope and meaning are very clear. But if the word is proceeded by a qualifying word 'ton', 'ton-mile' becomes a composite unit. It has now restrictive scope and it requiries special definition. Ton-miles are equal to the number of tons multiplied by the number of miles carried. Other examples of composite units are : 'a rent -freehouse', 'a factory - building', 'an industrial - dispute',' credit - sale', 'compound - interest', 'casual - worker', 'labour - hour'. The unit becomes still more complex when two or more qualifying words are added to it. Examples of such units are 'a unit output per machine hour' 'average costs of labour per unit of output'.

ii) Units of Analysis and Interpretation :

They are used in comparing, analysing and interpreting statistical data. They are summarised and derived figures. Rates, ratios, percentages and co-efficients are used for this purpose. When comparisions are to be made between quantities of different kinds, 'rates' are used. In this death-rate, birth-rate, sickness-rate, etc. Rates are usually expressed per thousand. When quantities to be compared are of the same thing 'ratios and percentages' are used. A ratio is a comparison of one magnitude with another as its multiple of fraction. When a ratio is multiplied by 100, it is a percentage. A co-efficient is a rate per unit. For example, if in a college, there are 1,500 male and 500 female students, the ratio of males to females is 3 : 1. This ratio based on sex is called ratio. The same relationship as 'the number of male students, in a college is 300 percent of female students'. If the literacy rate in a particular state is 40 percent or 400 per thousand, the co-efficient of literary is 0.4

d) Sources of Data and Techniques of Data Collection

The purpose and scope of investigation decide the sources of information. Basically, they are primary and secondary data. After finalising the source, the next step is to decide upon the extent to which the data should be collected from the source. The investigator has to choose one of the following alternatives.

i) Is it necessary to include and enumerate each and every object of the universe? (Census)

ii) Will it be sufficient if a part of the universe is selected and studied? (Sample)

It is not easy for the investigator to choose between the two without considering the nature and scope of the study, the availability of finance, the time factor and the degree of accuracy expected. For example, if it is desired to conduct a survey on the consumption pattern of handloom weavers in Tamilnadu, all the families engaged in handloom weaving may be included in the study. Assuming the consumption pattern to be uniform, we may also limit our investigation to a few families in those districts where handloom weaving is flourishing. In the former case, it is the census method where all the objects concerned are simultaneously included. In the latter case, it is the sample method as it includes only a significant part of the universe. Where accuracy is to be is given more importance, census method is the best one, though it is costlier and time consuming. This method is usually followed by the Government.

e) Chosen Frame

The whole structure of an enquiry is to a considerable extent determined by the frame. Having set the limits of the population or whole universe of enquiry, it is essential to iden-

tify the units which constitute the population. This is essential to avoid any overlapping of individual units. For this, each unit will have its own source, list, plan, map and other identifications. Suppose we want to study the effect of increase in the prices of commodities on the cost of living of cotton textile workers in Coimbatore city, the workers must be identified from others, for which, we prepare a list of names and addresses of the workers from the payrolls of all the mills in the city. This list of names and addresses is called 'a frame' for this enquiry. Units will be different in respect of source list and geographical limits. So there arises the need for constructing different types of frames. Usually there exist frames such as a census of population, the telephone directory, pay-rolls, voting lists, professional lists, town plans, maps of rural areas etc. The available frames may be a) inaccurate b) incomplete c) out of date d) inadequate and e) subject to duplication. For example, a population census cannot include day - today births and deaths as they are taken once in ten years. The utility of such a frame for a specific study diminishes over time until a new census is taken. So if the planning authority considers the existing frame quite inadequate, incomplete and out of date, steps must be taken immediately to construct up-to-date frames.

f) Degree of Accuracy

The question of accuracy must be considered in all statistical investigations. The degree, of accuracy is dependent upon the purpose of enquiry, the geographical coverage, measuring rods and the attitude of the enumerators and the informants. When all the items can be counted, it is often possible to attain perfect accuracy. If the task is a large one, approximate accuracy may be sufficient. Counts can be perfectly accurate but measurements can never be perfectly accurate. In measuring, absolute precision is unattainable.

g) Costing of the Plan

Money has to be spent on different stages while executing the plan of enquiry and the whole estimation must be properly budgeted. The costs have to be estimated taking into account the nature, scope and geographical coverage of the proposed enquiry. Costs have to be incurred on preliminary work, review of earlier studies, printing questionnaires, conducting personal interviews, coding, editing, tabulating and analysis of the collected data and final preparation of the report. The preliminary cost also includes the training of requisite personnel and the administrative expenditure. Certain intermediary costs such as hiring of skilled interviewers, follow-up procedures for non response will also arise. An economy of resources may be effected if time-phasing is given to various operations.

STEPS IN SAMPLING

After deciding to follow the sampling process, the following steps may be taken to

complete the research process :

a) Determination and definition of the population.
b) Deciding the degree of accuracy expected.
c) Finalising the different strata, stages of sampling and specifying the methods.
d) Calculating the sample size.
e) Cost - budgeting.
f) Fixing the time frame for the enumeration work.
g) Appointing administrative team to control, supervise and co-ordinate the activities,
h) Designing questionnaires, schedules, observation sheets etc.
i) Pre-testing the questionnaire.
j) Training the requisite personnel for collection of data.
k) Supervising the fieldwork and dealing with incomplete questionnaire.
l) Editing, Tabulating and preparation of Master Sheets.
m) Summarising and presentation of the information.
n) Analysis and interpretation of data.
o) Preparing the report for publication with remedial - curtive and preventive - measures in the form of recommendations and suggestions.

SAMPLING ERROR

Since a sample survey implies the study of small proportion of the total universe and drawing inference about the population, there would naturally be a certain amount of inaccuracy or error. This error attributed to fluctuations of sampling is called sampling error. The sampling error is expected to disappear in a complete enumeration since the whole population is surveyed. The error can be estimated mathematically.

Sampling errors are of two types. They are biased errors and unbiased errors. Biased errors arises as a result of any bias of the person in selecting a particular sampling method or instruments involved in the collection of data or the nature of statistical method followed. For example, deliberate sampling may be adopted in place of a simple random sampling. Biased error is one-sided. The error goes on accumulating with every measurement of the object with a defective measuring instrument. For example, if a metre is one cm short, it will always measure one cm. less. The error is onesided and the total error increases by a centimeter everytime a metre of cloth is measured. As a result of such a selection or use of defective instrument, some errors are bound to arise and they are known as biased errors. Such errors are also known as a cumulative errors.

Unbiased errors are such errors which are either accidental or arise due to chance differences, between the members of population included on the sample and those not in-

cluded. Such errors are without any bias. They are also known as Random Sampling errors. Unbiased errors do not accumulate with the increase in the size of observations but rather have a tendency to get neutralised and are the lowest in the ultimate analysis.

Bias may arise due to faulty process of selection, faulty work during the process of collecting information and faulty method of analysis.

Faulty selection of the sample may give rise to bias in a number of ways as follows:

a) Deliberate Selection of a Representative Sample

With the subjective selection of the sample, bias is inevitable. The investigator's desire or motive to obtain a certain result from the sample survey may influence his selection of the sample consciously or unconsciously.

b) Hapazard Selection

If the selection of the sample is hapazard, the chances of biased errors are more.

c) Substitution

Due to non-availability of the person chosen in sample, another may be interviewed, who may not have the same characteristics as the original one. This will introduce substitution bias in the sample.

d) Items included in the Sample not covered

If all the items to be included in the sample are not covered there will be bias even though substitution has been attempted.

e) An appeal to Vanity

Of the person interviewed may give rise to yet another kind, of bias. For example the question 'Are you a good student?' is that most of the students would succumb to vanity and answer 'yes'.

During the process of collecting the actual information in survey, certain inaccuracies and mistakes may creep in. These may arise due to improper formulation of the problem, wrongly defining the population, specifying the wrong decisions, securing an inadequate frame, poorly designed questionnaire, an illtrained interviewer, failure of respondents memory, unorganised collection procedure and faulty editing and coding of responses.

The danger of such error is however, likely to be greater in sampling work since the units measured are often smaller.

In addition to bias which arises from faulty process of selection and faulty collection of information, faulty methods of analysis of data may also introduce bias.

Avoidance of Bias

The conclusions drawn from the sample cannot be considered as fully objective if any bias exists. The elimination of all sources of bias is, therefore a must in sampling or census procedure. Avoidance of bias is possible only in the method of selection process.

The selection process should be adopted entirely at random or at-random subject to some restrictions. It will definitely improve the accuracy and at the same time it will not introduce any bias in the results.

The sample, once selected, should be strictly adhered to throughout the enquiry. No substitutions should be allowed to enter the survey. The investigator should try to investigate the entire sample.

Bias arising from faulty collection of data may be removed by adopting the proper methods of analysis.

Method of Reducing Sampling Error

The sampling error must be reduced to the minimum so as to attain the desired accuracy. This can be done firstly by removing errors of bias from the sample and secondly by enlarging the sample. The sampling error decreases with the increase in sample size. As a matter of fact in many situation the decrease is approximately inversely proportional to the square root of the number of units included in the sample.

Non-Sampling Error

There is a general feeling that the data obtained in an investigation by complete enumeration is free from error. However in actual practice it is not so. Non-sampling errors occur at every stage of planning and execution of the survey and collection, processing and analysis of the data. During the process of collecting information certain inaccuracies and mistakes may creep in. These inaccuracies are due to the negligence or bias of the investigators in asking the questions or in recording the answers. They are also due to the negligence or bias or lack of knowledge on the part of the informants. These inaccuracies taken together constitute the non-sampling errors and they occur, both in the census as well as sample surveys. Non sampling errors are likely to be more in case of complete enumeration, than in case of a sample survey because they increase with the increase in the number of units, to be examined and enumerated. Non-sampling errors may arise from one or more of the following reasons.

1. Faulty planning including vague definitions of population or the statistical units to be used.
2. Imperfection of frame work.
3. Vague and imperfect questionnaire which might result in in-complete or wrong information.
4. Inadequate and defective methods of interviewing and asking questions.
5. Exaggregated or irrelevant responses to questions which appear to pride or prestige or self interest of the respondent.
6. Lack of trained and qualified investigations and lack of supervisory staff.
7. Wrong or inadequate response as given by the respondents.

8. Wrong computations, approximations and entries made during the processing and analysis of data.
9. Application of inappropriate statistical units.
10. Errors committed during presentation and printing of tabulated results.

SAMPLE

(any subject of a well defined universe)

Multistage Sample
a successive sampling of sub units, from the first units sampled

Cluster Sample
Small groups of units

PROBABILITY SAMPLES

(all samples have a known probability different from 0 or 1 being selected)

Simple randon (all sample units have an equal probability of being selected)

Systematic sample (sample is obtained from taking evey'n' the number from a source list)

Stratified sample (the universe is divided with strata and units are selected at random from each stratum)

STRATIFIED SAMPLE

Disproportionate
Sample fraction is different

Proportionate
Sampling fraction is the same for all strata

Factorial Design
(both same sample size for combinations)

Quota Sample
a proportionate representative sample
1. On anyone variable
2. On combinations of variables.

Simple random sample

In this technique every item or unit of the domain has an equal opportunity for selection and this selection is in no way influenced by personal bias and prediction of the investigator. No item is selected on account of likes or dislikes of the investigator and the selection is left entirely to chance. This provide a very item fair and equal chance for selection; so it is not investigator's whom but nature which determines the selection.

Several techniques can be used to get a random sample. They are given below:

1) Lottery Method

This is the simplest way of making the selection. The number of items in a date are

written on sheets of paper or cards and they are thrown into a box. Now the investigator blindfolding himself selects the number of item required in the sample. Here there is no partiality in favour of any item. The play of chance is allowed to determine the items selected in the sample.

2) Tippett's table of random number

On the basis of population statistics', Tippet has constructed a random list of four digits each of 10,400 institutions. These numbers are result of combining 41,600 populations statistics report. On the basis of Tippets numbers it is very easy to select samples. If a domain has 8000 items and we wish to select first 30, than we shall firstly arrange serially items 1 to 8000, and then select from the above schedule first thirty such items which do not exceed the number 8000. Tippet's numbers are widely used in making random selections.

3) Selection from sequential list

In this procedure units are broken up in numerical, Alphabetical or Geographical sequence. Now we may decide to choose 1,5,10,15 and so on, if the division is alphabetical we decide to choose every item starting a, c, m, o etc.

Advantages

1. This method is more representative since in this method each unit has equal chance to be selected.
2. There is no scope for bias and prejudices.
3. The method is very simple to use.
4. It is easy to find out the errors in this method.

Disadvantages

1. If the units or items are widely dispersed, the selection of sample becomes impossible.
2. If the universe is heterogeneous in nature, this method becomes inapplicable.

Systematic Sampling

This is a variation of simple random sampling, it requires that the population i.e., a list of its members, be ordered in such a way that each element of the population can be uniquely identified by its order. Selection is done at the 'n' the number. If the 'n' the number is 10, we can start by selecting any number between 1 and 10.

It should be remembered that a systematic sample can be a probability sample only if the first case has been selected randomly from the first ten cases and every 10th number from the sample frame selected thereafter.

Merits

1. This method is simple to follow.
2. This method distributes the sample more evenly over the entire listed population.

Demerits

1. This method is not truly random. All items selected for the sample (except the first item) are predetermined by the constant inverval.

2. This method may some times result into a badly biased sample. For e.g. if by chance every 10th, 23rd, 25th, 50th expenses voucher in the universe is one made out by an executive, the sample drawn would over-represent the expenses by executives which may be certain special characteristics.

Stratified random sampling

In this method the population is first divided into a number of homogeneous strata. Such strata may be based on a single criterion. e.g. education or age or sex : males under 40 years or males over 40 years. From each strata, units are selected at random in order to include in the sample.

Stratified random sampling is divided into proportionate random sampling and disproportionate.

Random sampling.

The advantage of proportionate random sampling is that it ensures a proper representation of attributes or variables which the researcher considers most significant for the study. Its difficulty is that one should know what proportion of population falls in each stratum.

Disproportionate Stratified Sampling

If the units drawn from each stratum is independent of the size of the stratum it is called disproportionate stratified sampling. Some times same number will be drawn from various strata regardless of their size.

One advantage of this type is that all the strata are equally reliable from the point of view of the size of the sample. Another advantage is that it is economical since the investigator need not take a large samples from a big stratum.

Considerations for stratification

a) The information about strata should be up-to-date, accurate, relevant, complete and available to the researcher.
b) There should be perfect homogeneity in the different units of strata.
c) Stratification must be clear, well defined and free from overlaping.
d) The size of stratified sampling must not be too small.
e) Different variables involved in the study should be taken into account.

Merits

1. By this method, a representative selection can be made with a few number of items.
2. Replacement of an inaccessible case by an accessible case is easily possible.
3. In this type, no significant group is left out.
4. This method saves time and money as most of the items or units can be geographically concentrated.

Purposive Sampling

The purposive sample is also called the judgement sample. These terms indicate

selection by design-by choice. In purposive sampling a sample is chosen which is thought to be typical of the universe with regard to the characteristic under investigation.

Merits

1. It's very simple to draw. People often use it in exploratory investigations which precede major surveys.
2. It is less costly and involves less field work since those units can be selected which are close to each other.
3. It is more representative of 'typical' conditions than the random sample if the size of sample is small.

Demerits

1. It is not always reliable. The human mind has difficulty in recognizing typical items. This difficulty tends to distort purposive sampling.
2. It requires from the researcher considerable knowledge about the population which he usually does not possess.

Quota sampling

A method of selecting a sample often employed in market and public opinion polls is that of quota sampling in which an interviewer instead of receiving a list of names and addresses to be interviewed, receives the 'quota' or the number of interviews which he's to conduct of persons who satisfy certain conditions about sex, age, income etc. Thus he may be asked to interview. 20 businessman over 50 years of age in a particular area. The interviewer can than select at his own discretion any 20 businessmen of that area who are over 50 years of age.

Merits

1. It reduces cost of preparing sample and field work.
2. By auxing the investigator to satisfy certain conditions in choosing his sample it in a way, stratifies the population.

Demerits

In this type of sample the investigator very often selects those respondents whom he knows. This vitiates the enquiry because the respondents many times display what may be called courtesy effect i.e., they give the interviewer the kind of response they believe he seeks rather than what they themselves actually believe.

Multi-stage random sampling or sub-sampling

Under this method sample is prepared by stages. The population is divided into a number of large sampling units, each of which in turn is divided into smaller units and so on. A random sample is taken of the large units at the first stage is collected of the smaller units, suppose, we want to take a sample of 5000 households from Andhra Pradesh. At the first stage, the state may be divided into number of districts and a few districts selected at random. At

the second stage, each district may be subdivided into a number of villages and a sample of villages may be taken at random. At the third stage, 5000 household may be selected from the villàges selected at the second stage.

Merits

1. Sampling lists, identification, and numbering are required only for units selected in the sample at each stage and not for all the units of the population.
2. If sampling units at each stage are geographically defined (such as district, village etc.,), this method cuts down field costs (i.e.,) travel.

Demerits

1. Efforts increase as the number of sampling units selected decreases.

Convenience Sampling

In this method the researcher selects those units of the population in the sample which appear convenient to him or to the management of the organisation where he is conducting research. The management may tell the researcher that certain individuals alone can be included in the sample while others cannot. One important demerit of this method is that the results obtained by following this method cannot be generalized beyond the study's sample. But this does not mean that such studies are of no value. The cumulative results of many such studies of the same phenomenon by different researchers provide basis for assessing the merits of a given hypothesis.

Prepared by
Prof. M, JEZER JEBANESAN

CHAPTER-VII
DATA ANALYSIS AND INTERPRETATION

Research process involves several stages of progress many of which have already been discussed in earlier chapters. Data anaiysis and interpretation are the penultimate steps to be undertaken after the field part of survey is completed. The information obtained in the questionnaire, schedule or in any other form constitutes the material warranting the analysis and interpretation to follow. The processing of the material begins to accomplish the tasks involved in it. It includes;

1. The questionnaire has to be checked;
2. The mass of details has to be reduced to manageable proportions.
3. The materials have to be summarised in tabular form or otherwise analysed so as to bring out its salient features.
4. The results have to be interpreted and presented in the form of a report.

The first task is technically called data processing, the second coding, the third classification, and the fourth analysis and interpretation.

DATA PROCESSING

Data processing means a series of operation deliberately undertaken on the data made available for purpose of arriving at certain conclusions which may or may not support the hypothesis which is formulated at the beginning of the research work. In brief the data are processed after the collection and analysed in accordance with the outline laid down for the purpose at the time of developing the research plan. Data processing involves specific operations such as editing, coding, classification and tabulation of data such that they are amenable to analysis.

Editing

Editing is a process which seeks to remove errors, inadequacies, irrelevant information, incompleteness or inconsistencies of the data. It is a routine work although one requires scrupulous care.

At the various stages in research work from the collection of information from the respondents through to the production of the results to the survey reports, errors can creep in. In processing the data, the aim is to keep these errors to a minimum. Editing of the survey schedules in intended to detect and as far as possible eliminate errors in the completed questionnaires. Even the best interviewers are liable to make errors, omit to ask questions or to record answers, when the field staff is inexperienced, editing assumes a crucial importance. Before the questionnaires can be regarded as ready for coding and subsequent operations, they should be checked for completeness, accuracy and uniformity.

1. Completeness

If the interviewer has forgotten to ask a question or to record the answer, it may be possible to deduce from other information on the questionnaire what the answer should have been and thus to fill the gap at the editing stage. When many questions remain unanswered, the questionnaire itself may have to be abandoned, or heavily restructured. However, it is done as the last resort. Thus editing of the survey schedule is intended to ensure maximum reliable information useful to the research analysis.

An omission is especially trying when neither the context of the question, nor answers to other questions, enable one to decide whether

i) the respondent refused to give an answer
ii) the interviewer forgot to ask the question or record the answer, or
iii) the question was not applicable to the respondent.

Non-applicability can easily be deduced from other data, but it is usually difficult to choose between the other explanations of an omission. Many organisations instruct the interviewers to record an answer for every question. Such a training helps minimise omissions. They are further advised to see that there are no "do not know", "cannot remember", or "refused to answer" responses and that all the responses are legibly recorded and not

merely scribbled by the interviewer to hide his language deficiency.

Checking the completeness, of the answers recorded for open questions is virtually impossible. Apart from seeing that the answer is legible enough for the coder and that it makes sense that the interviewer has written down enough to make the meaning of the answer clear, unless the interview has been tape-recorded or respondents have been re-interviewed.

2. Accuracy

It is not enough to check that all the questions are answered; one must try to check whether the answers are accurate. In the first place, inconsistencies should be looked for. Every effort should be made to resolve clear inconsistencies, but care should be taken to make corrections only where there has quite obviously been an error. An apparent inconsistency may be genuine, and to iron them out would result in a false picture. Inaccuracy may be due to a conscious attempt to give misleading answers and it may arise from either respondent or interviewer. In the stress and strain, the interviewer may easily encircle a wrong code or so place the ring that it is not clear which of the two codes is intended. Answers needing arithmetic, even of the simplest kind often cause trouble. It is therefore, better to have arithmetic done in the office rather than by the interviewer or the respondent. A careful editing can remove all these errors and ensure accuracy.

3. Uniformity

It implies an effort to check that interviewer has interpreted the questions and instructions uniformly. The editor should keep a keen look out for any lack of uniformity in the way data have been collected or the replies recorded.

If the analysis is to be carried out on a computer, the initial office editing will almost certainly be supplemented by a more detailed, vigorous and dependable computer editing just before the start of the analysis. In this case the initial editing is of lesser importance and if there is good reason to believe that there are very few errors in the questionnaires, it may even be dispensed with entirely. On the other hand, if there could be a number of errors as in the case of inexperienced field workers, an initial editing will still be worthwhile, because errors found early in the processing are easier to correct than those detected later.

There remains the question whether in the initial editing a questionnaire should be edited as a whole or whether one section or even one question should be edited at a time for all questionnaires. It is probably easier to avoid mistakes if one can concentrate on one or two questions at a time. On the other hand, editing a whole questionnaire facilitates viewing the individual case as a whole noting the relationship between the answers to the different questions and detecting inconsistencies. It also helps the judging of an interviewer's ability and enables one to get on with the editing as the questionnaires come in, instead of having waited until the field work is complete.

Moreover we should pay attention to the value of an efficient record system for locating the questionnaires. In large scale surveys, different questionnaires may be reached different stages of the processing operation; some may be being edited, others coded, others may be with punch operators and yet others may be with the interviewers, either because the questionnaires were found to lack certain answers and were, therefore, returned to the interviewers for completion or because the interviews have yet to be conducted. In this kind of situation the only way the researcher can hope to keep track of all the questionnaires is by setting up a routine and easily updated record system. Editing thus aims in all respects to ensure complete and accurate information and information collected with uniform understanding of the questions.

Editors should keep in view a few significant points while performing their work. They are:

1. The editors must be familiar with the instructions given to the interviewers and coders as well as with the editing instructions supplied to them for the purpose.
2. While scoring out an original entry for some reason or other, they should just draw a single line on it so that the original entry remains legible.
3. The editors should make entries on the questionnaire in some distinctive colour and, that too, in standardised form.
4. They should initial all answers which they change or supply.
5. Editor's initials and the data of editing should be placed on each completed questionnaire or schedule.

Kinds of Editing

There are two types of editing in practice viz., field editing and central editing. Both the types have useful role in the research process.

Field editing consists in the review of the questionnaire by the investigator for completing (translating or rewriting) what the interviewer has written in abbreviated or in inelligible form at the time of recording the responses. This type of editing becomes necessary when the writing styles often can be difficult for others to make out or decipher. It should be done as soon as possible after the interview preferably on the very day or on the next day. Care should be exercised by the investigator to see that the investigator restrains himself and does not correct errors especially of omission by simply guessing what the respondent would have said, had the question been asked.

On the other hand, central editing takes place when all the questionnaires or schedules have been completed and returned to the office. This type of editing implies that all the questionnaires or schedules should get a thorough editing by a single editor in a small study or by a team of editors in the case of a large survey. Editor may correct the obvious errors such as entries in the wrong place. entry recorded in the place of months instead of dates,

and the like. In cases of inappropriate or missing information, the editor can sometimes determine the proper answer by reviewing the information furnished in the schedule. At times, the respondent can be contacted for classification. The editor must score out the answer if it is inappropriate and there is no basis for determining the correct answer or the response. In such a case an editing entry of "no answer" is called for. All the wrong replies, which are quite obvious, must be dropped from the final results, especially in the context of surveys by mailing of the schedules.

Coding

Coding refers to the process of assigning numerals or other symbols to responses in order to have a limited number of categories or classes appropriate to the research problem under consideration. In most surveys, certainly whenever results are to be put in quantitative form, the intermediate state is the coding of the answers. Sometimes this and the initial editing are joined in a single operation. Coding is necessary for efficient analysis and through it the several replies are reduced to a small number of classes which contain the critical information required for the analysis. The purpose of coding in surveys is to classify the answers to a question into meaningful categories, so as to bring out their essential pattern. It is more a content analysis which is typically a systematic analysis and description of the content of communication media. The process of coding involves two distinct steps. The first is to decide on the categories to be used and the second to allocate individual answers to them. Moreover, coding can be done either before the actual data collection or after it. When it is done before the actual data collection, it has been suggested that the coding should be tested along with the questionnaire or schedule in a pilot survey because this will give to the researcher extract knowledge about the various response categories that would eventually arise at the time of data collection. Coding before the actual data collection is also known as pre-coding.

In practice coding frame and code book system are referred to as very important procedure. The set of categories form the coding frame, while the set of coding frames covering all the information to be abstracted from the questionnaires is commonly known as the code book.

Coding Frame

Mostly a coding frame relates to a single question, and in cases where there are a few possible answers to the question the preparation of the frame raises no problem. In other cases where the frame does not determine itself automatically, it is a matter of deciding how detailed a grouping to allow for in the coding, which in turn will depend on how the answers

are expected to be distributed and what analysis is being planned. One cannot lay down any hard and fast rules for this kind of decision. For example, for a question in the schedule, "What kind of house do you live in?", the response may be from any of the following alternatives:

Whole detached house	...	5
Whole semi-detached house	...	6
Whole terraced house	...	7
Self-contained flat	...	8
Others (give details)	...	9
Not applicable	...	Y

In the above, 5,6,7,8,9,Y are the codes forming the frame.

Establishing a code frame is not generally as easy a task as the remarks so far suggest. Some coding frames will relate not to a single question as above, but to a combination of questions or even the whole questionnaire. Before a frame is finalised every opportunity should be given to coders to test it further on samples of replies, so as to examine their coding differences and eliminate ambiguous or troublesome codes. This not only results in a better frame but also serves as good training for the coders. If insufficient trouble is taken at this preparatory stage, the final coding will be repeatedly held up because answers do not seem to fit properly in any code or, just as bad, could reasonably be assigned to more than one category.

Many of the coding frames will need to be developed to cater specifically to the purposes of the survey in hand, but even so account should be taken for existing frames. If a researcher can reasonably make his frame consistent with a frame used in another survey, he has the benefit of being able to compare his results with those of the other survey. On the whole, the coding frames to be employed should not be designed without reference to the means of analysis. The coding frames should be designed keeping in view that the whole point of coding is to summarise the data, and that it is an unhelpful to retain too many categories as it is misleading to use too few.

Code Book

Code Book is the book containing the set of coding frames covering all the information to be abstracted from the survey schedules. For pretesting of codes a 'mock code book' is constructed which shows the various codes which have been tentatively assigned different response categories. A simple demonstrative model of a mock code book contains columns for question number, description variable, response categories and codes assigned.

MODE CODE BOOK

Question No.	Variable Description	Response Categories	Codes
1	Sex	Male	lm
		Female	lf
2.	Age	Actual Age	2.23
3.	Religion	Hinduism	1
		Islam	2
		Christianity	3
		Sikhism	4
		Jainism	5
		Others, specify	6
		Do not know	7

In the first case 1 stands for question number and for male and for female. In the second case 2 stand for question number and 23 for age and so on. The same becomes a code book where it is prepared and maintained for the actual entries in the schedule after data collection. It contains the final categories and codes for all possible reponses to each question including those which were open ended in the Mock Code Book.

In order to reduce errors, each interview schedule should be coded by two independent Codes and the results are compared. This can be done on 10 to 20% of the sample schedules to contain cost and time within limits. The process of proceeding carries certain advantages. They are:

1. Collection of data can be speeded up and save time.
2. Better accuracy can be achieved.
3. Need to interpret separately after data collection is avoided.
4. Comparison with other researches is made feasible and effective.

However non-random bias and errors become difficult by this methods.

Classification

Data collection results in a large volume of raw data which must be reduced into homogeneous groups if we are to get meaningful relationships. This necessitates classification of data which happens to be the process of arranging data in groups or classes on the basis of common characteristics according to the codes or otherwise. The characteristics of any data can be either descriptive or numerical. Occupation, literacy, sex, etc. are descriptive characteristics, while age, income, height, weight, etc. are examples of numerical characteristics, Descriptive data cannot be measured in quantitative terms. Whereas only their presence or absence can be recorded. The classification on the basis of descriptive data is said to be classification according to attributes. When the data are classified on the basis of

quantitative measurements the classification is according to class intervals.

Classification can, therefore, be one of the following two types depending upon the nature of the phenomenon involved:

1. Classification according to attributes

It is based on the descriptive characteristics as referred to earlier. Data obtained this way on the basis of certain attributes known as statistics of attributes. The classification can be simple classification or manifold classification with only one attribute and divide the universe into two classes, one consisting of items possessing the given attribute and the other not possessing the attribute. In manifold classification, two or more attributes are considered simultaneously, and divide the data into a number of classes. Whenever data are classified according to attributes, the attributes should be defined in such manner that there is lease possibility of any doubt or ambiguity concerning the attributes referred to.

2. Classification according to class-intervals

Under this classification, the numerical characteristics are the basis. Numerical characteristics refers to quantitative phenomenon which can be measured in terms of certain statistical units. Such data are known as statistical variables. Example of this classification are income group having income from 201-400, from401-500, age group between 0-10,10-20,20-30, etc., we may have classes with equal intervals or unequal intervals. For this purpose one needs to decide specifically on number of classes, class limits and frequency of each class.

Required number of classes may be from 5 to 15 and the objective should be to display the data in such a way as to make it meaningful for the analysist. Class interval also should be of seasonable size. H.A. Sturges has suggested the following formula to decide the class interval. It is:

$$i = R/1+3.31ogN$$

Where i = size of class interval

R = Range (the difference between the largest and the lowers values in the series)

N = Number of items to be grouped.

Transcription

Transcription is the process of transferring information from the questionnaire or interview schedule to a card so that there is one card corresponding to each unit in the survey population. This has inherently two merits.

(i) manual and mechanical sorting of information becomes easy; and

(ii) records in the form of original schedules remain in tact without any sort of markings on them.

Sometimes errors may creep in when data are transferred from the interview schedule to the card. This can be avoided, if two individuals make independent transcriptions for comparison and remove errors, if any. Separate kinds of cards are used for use in manual counting and manual sorting. In manual counting and mechanical sorting and in machine or computer sorting and punching. The cards are punched for the purpose of classification.Coding the transcription are the operations which are very helpful in classification.

Tabulation :

Tabulation is the summarisation of results in the form of some tables of statistical analysis. It amounts to counting of the number of cases falling into each of several classes. The editing, coding and classification have sought to ensure that the information on the individual schedule is accurate and categorised in suitable form. Tabulation adds all the schedules together to count how many of them have a particular answer. The process can be done manually. Hand tabulation is exceedingly simple involving no technical knowledge or skill. On the other hand, if a number of tables are to be constructed, it may be inconvenient to go through the schedules each time and an alternative is to transfer first the relevant data to cards from which counting can more easily be made. Manual tabulation process may be suitable to small survey where the individual cases may be of the order of 100-200. But for large surveys, analysis require complicated cross-tabulations involving more than two variables, machine tabulation process alone can find solution. Machine tabulation possess high degree of flexibility.

Rules for preparing tables

Specific procedures are a must to prepare effective statistical tables. A few rules for this purpose are:

1. The table should be simple and easy to understand.
2. All the tables should have a title placed above the table. The title should be descriptive of the contents of the table. The units of measurement and the year to which the figures relate must also be given after the title.
3. Every table should be identified by a number to facilitate reference.
4. The headings inside the table in columns and rows are of two types. Those appearing on top of the colums are called captions or column heading. Those appearing on the rows are called the row heading or stubs. Headings of either kinds should be as brief as is consistent with clarity.
5. Items should be arranged either in alphabetical, chronological or geographical order or according to size, importance, emphasis or causal relationship to facilitate comparison.
6. On many occasions columns and rows are numbered to facilitate reference and for clarity.
7. Totals may be placed either at top or at the bottom of the columns, preferably at the bottom.

8. Explanatory footnotes, wherever necessary, are given reference symbols and are placed beneath the table with acknowledgements to the original sources.

Describe the above facts, there are no hard and fast rules in this respect. Tables must suit the needs and requirements of the research. It has been the remark made quite often, "In collection and tabulation common sense is the chief requisite and the experience the chief teacher".

Analysis and Interpretation

Following editing, coding, classification and tabulation, the analysis and interpretation of the data is the most skilled task of all other. It is a task calling for the researcher's own judgement and skill, not to be delegated to assistance. The routine of analysis may not be difficult, but properly to guide it and the accompanying interpretation required a familiarity with the background of the research work and with all its stages which only the researcher is likely to possess. Analysis becomes necessary because raw data seldom speak for themselves. Nevertheless analysis of research material does not necessarily have to be statistical. Non-quantitative methods of analysis and evaluation are usually non-statistical in nature. However, regarding data involving numbers statistical analysis becomes essential for effective results. Statistical analysis is important where the research data are based upon a sample of the population about which conclusions are to be draw, since the researcher has the problem of estimating the population characteristics from those of the sample and also of estimating sample errors.

Whether it is statistical method of analysis or non-statistical analysis, the manner in which data can be analysed depends to a greate extent upon the measurement and sampling procedure followed in their collection.

Statistical Analysis

Statistical analysis is more precise and objective. It is also useful to evaluate the quality of research. There are several tools to describe the research data. The choice of a suitable tool and the actual analysis of data depend upon a number of factors. Most important among them are:

1. **Type of measurement done.**
2. **Number of variable to be analysed.**
3. **Types of analysis be made** (whether it is required to estimate a parameter or to test a hypothesis).

Measurement

There are four types of measurement for purposes of recording and ordering data. They are nominal, ordinal, interval and ratio.

Nominal measurement is the most elementary method of measurement which classifies persons, objects or events into a number of mutually exclusive categories on the basis of the simple presence or absence, applicability or inapplicability, possession or non-possession of certain property. For example, the population of a town may be classified according to sex into males and females or according to religion into Hindus, Muslims, Sikhs and Christians and each category of persons given certain symbols either in the form of numerals (0, 1, 2, 3) or in the form of letters (A, B, C, D). These measurements determine the nature of statistical tools to be used and also the nature of analysis to be carried out. Nominal measurement is relevant to non-parametric tools. Since most measurements in behavioural science research give rise to nominal data, the non-parametric tools are of special significance.

Ordinal measurement uses numerals, letters or other symbols to rank objects. Ordinal data indicate the relative position of two or more objects on some characteristics. Their most common use in obtaining preference measurements. Attitude measures are also often ordinal in nature. This measurement has gained significance in marketing research especially consumer oriented research. Where consumer are asked to rank preferences to brands, flavours, designs, package etc. In analysing, this type of measurement takes in non-parametric tools.

Interval measurement represent numerals used to rank objects such that numerically equal distances on the scale represent equal distance in the property being measured. One can know how far apart the objects are with respect to the property in question by comparing the distances. For example, in measuring the achievements of four youths, A, B, C, and D on an interval scale and obtain the values 1,4,5 and 8 respectively as found in the scale given in 1.

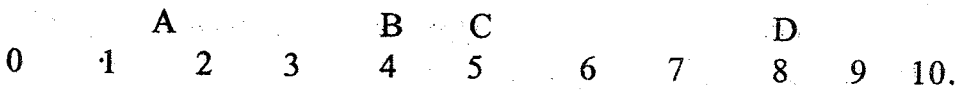

Fig. 8.1

Comparing the intervals one can legitimately say that the performance difference between A and C, viz., (5-1) 4 and that between B and D, viz., (8-4) 4 in the same. However it does not mean that the achievement of D is twice that of B.

Survey data interval measurement permit the use of parametric tools. Parametric tools make certain assumptions about the nature of the population from which the sample is drawn. For example, the tool may assume that the sample is drawn from a normally distributed population or from a population having the same variance or spread of scores.

Ratio measurement possesses one additional property compared to the other three kinds of measurements. It has a true, natural or absolute zero point and in all other cases zero is only arbitrary. Height and Weight are obvious examples. Sales, costs, length, time etc., are other common examples. Under this the comparison of the absolute magnitude of the number becomes possible. A person weighing 100 kg in twice as heavy as one weighing 50 kg. with a ratio scale. One can compare intervals, rank objects according to magnitude, or use the numbers to identify the objects.

Ratio scales also permit the use of parametric tools for analysis purposes. The tools require that the variable involved are truly numerical. They must have been measured in ratio scale for the purpose of analysis.

In summary two statistical tools, namely parametric tools and non-parametric tools are chosen for analysis of research data based on the nature of measurement. If data are inherently in ranks or even if they can only be classified i.e., can be measured in a nominal or ordinal scale, non-parametric tools can be used, and instead, if they can be measured in an interval scale or ration scale, parametric tools can be used.

2. Number of variables

If the researcher attempts to describe a single population by the use of a single variable than an attribute, averages of several kinds, measurements of dispersion, percentages supplemented by suitable diagrams are used. On the other hand, if it were an attempt to describe the population by the use of a single attribute, univariate model may better be used. For example a study may be for determining the average per capital income in Tamilnadu. However studies involving a number of variable, the use of bivariate or multivariate techniques is appropriate.

3. Types of analysis

Research analysis may involve parameter estimation of hypothesis testing. Parameter estimation implies the evaluation of sample statistics without taking into consideration the researcher's expectations regarding the true values of the parameters. For example, confidence intervals and confidence levels can be used to evaluate sample statistics obtained to estimate percentage of females in a population (nominal scale) and its average (ratio scale)

Hypothesis testing evaluates sample statistics in terms of the researcher's expectations regarding the true value of the parameters. It is quite commonly used in descriptive studies. For example, a researcher may use sample data to test the hypothesis that the average income in Coimbatore is above the national average.

Casual studies tend to depend almost exclusively upon hypothesis testing to measure sampling error. For example, a researcher may wish to test the hypothesis that the average sales of an experimental group that had done direct mail advertising is greater than the average sales of a control group that has done no advertising.

Interpretation

The task of drawing inferences and conclusions forms the next task. It involves explaining the significance of the various inferences and it calls for a very careful analysis of the data collected in the process. The study of the relationships between two variable is straight forward so long as one is content merely to state the latent and direction of the association. But when one tries to investigate its meaning to make cause and effect inferences difficulties arise.

The basic object of every research is to find out the nature or type of relationship which subsists between any two variable. There may be any of the following three types of relationships, viz.

1. Symmetrical relationship
2. Reciprocal relationship, and
3. Assymmetrical relationship.

Symmetrical relationship exists, when neither variable is the cause of the other. For example, the people who do well on verbal tests also do well on Mathematics test. But we cannot assume that the mathematical ability is responsible for the verbal ability, not vice versa.

Symmetrical relationship may further be of five types :

1. Both the variables may be alternative indicators of the same concept. For example, heart beat and perspiration may indicate signs of anxiety, but neither is the cause of the other.
2. Both the variables under study may be the effects of a common cause. For instance, the in crease in number of hospitals coming up and increase in number of air flights may be the results of a common cause, viz., economic development.
3. Both the elements may be indispensable elements of a total system. Heart and lung of a person are the instance. Both are indispensably present in a man. They are functionally interdependent. But one does not cause the other.
4. Both the variables under consideration may be arbitary elements of a common systems or com plex. For example, there may be statistical association between joining a club and watching a cabare dance. They are the elements of a certain style of life but no indispensable. Nor is there any casual relationship.
5. Both the variables may be fortuitously correlated. The correlation between the number of marriages and increases in imports of foodgrains does not mean that one causes the other. The co-occurence is quiet accidental.

2. Reciprocal relationships:

This implies a situation that there may be caused forces in operation, but it cannot be decided which is the dependent variable and which one independent variable. The relationship between two variables in such a situation is called reciprocal relationship or interacting and mutually reinforcing relationship. Each may be cause and each is effect. Relationship between profits and investments, political affiliation and exposure, employment and seller, farmers adoption of innovations and their socio-economic status, etc., are some of the examples for reciprocal relationship. It stands between symmetrical relationship and assymmetrical relationship. In reciprocal relationship one cannot say which of the two variables in the cause and which one effect, which one is independent and which one is depen-

dent variable. At the same time it is symmetrical in the sense that each variable is continuously affecting the other.

3. Asymmetrical relationship:

This relationship exists when one variable is the dominant determinant of the other. The basic criteria of deciding which variable is determining variable which one is determined variable are fixed or alterable nature of the variables and the time order. It younger people go to movies it is obvious that is some aspect of their age which is responsible for the movie attendance, since there is no way in which going to the movies can make one young.

The importance of the time sequence in deciding the direction of determination has been universally emphasised. It follows that what happens later cannot be responsible for what happened earlier.

Once the decision is made that the relationship is asymmetrical, one then introduces a third variable called a test factor into the analysis and interpretation. This is known as the process of elaboration. The primary purpose of elaboration is to guard against misleading interpretations which might result from, the assumption that an inherent link exists by answering the questions "Why and under what circumstances". Suppose one finds that the percentage of people who listen to religious programmes in the ratio is higher among the older ones than that among the younger ones. One may their introduce an additional variable of education into our analysis and proceed to test the hypothesis that it is not the age which is actually responsible for listening habit but the intervening factor of education. In other words if we eliminate the influence of education, there would be almost no relationship between age and listening.

COMMON ERRORS IN INTERPRETATION

Correct interpretation requires high degree of skill, care, judgement and objectivity on the part of the researcher. It is a very difficult task to interpret data collected in the process of the survey. A person does not possess reasonably high standard in the science of statistics he is likely to misinterpert the resultant data. Despite the fact that the errors quite often creep into the analysis process and interpretation, researcher must gaurd himself against the following mistakes:

1. Inappropriate Comparison:

Differences in definitions of the variables being compared make the comparison inappropriate. For instance, the national income figures of two countries should have been defined with the same compenent elements to make the comparison come out with a meaningful interpretation. If one compares the wholesale price index of 1980 with that of 1990, the number of commodities included, their qualities and the method constructing the index should be the same for both the years, otherwise the comparison of the indices of the two countries will not be meaningful.

2. Faulty inference:

They occur when comparison is made hurriedly on the basis of inadequate data. Comparison of two firms performance efficiency on the basis of absolute profits and inference that the firms with higher profit is more efficient than the one with less profit without giving consideration to the size of capital employed, market size and the volume of sales cannot come out with reliable interpretation.

3. Errors in the use of various tools of analysis like mean, medium, mode, standard, deviation, correlation, percentage etc:

A fee instances are referred to here:

(i) Use of absolute numbers instead of percentages quite often misleads interpretation.

(ii) Sometimes the use of percentage instead of absolute figures mislead inference. For example, 331 / 3%of the women student in a faculty of 3 students have married members of the faculty. Without large representative number, it is a misleading interpretation.

(iii) Misuse of the mean :

Average from distributions with extreme often affect seriously the validness of representativeness of the data. If the elders of shares in a company consist of 201 persons, one holding 9000 shares out of 10,000,200 persons 1000 share the average is 10,000/200 = 50 shares. It is not true representative of the group.

(iv) Failure to use weighted mean :

On many occasions weighted mean becomes an effective tool of interpretation. For example, there are four maintenance workers whose average weight is 105 kg. and ten machine operators whose average weight is 55 kg. It will be erroneous to report the average weight as 105+55/2 = 80kg. The interpretation is more meaningful if it is reported in weighted average as (105x4) + (50xl0)/14 = 69.3 kg.

(v) Distard of disperson :

Dispersion should be carefully considered for a reliable interpretation of data. When we say that average depth of a river in 3 metres, it does not mean that it is the depth all through the river. It may be more in some places and at others it may be shallow. In order to interpret the data with a responsibly true picture, dispersion should be given due consideration in the analysis.

(vi) Misuse of Correlation :

A linear correlation between two variables may exist if at all it does, only within certain limits. If there exists positive correlation between agriculture yield and more rain, too much of rain may destroy the crop. Thus instead of a linear positive correlation, there may be curvilinear correlation upto a certain point, and thereafter a negative correlation setting in.

4. **Faulty genevalisations on the basis of incorrect of non-representative samples:**
   Inadequate sample land the researcher in trouble of misleading inferences.
5. **Inadequate attention to individual cases**

On many occasion, the results of analysis may not support the hypothesis. But the researcher should not reject the hypothesis. His effort should be to deep into the data and pay more attention to individual cases before he finally accepts the rejection of the hypothesis. It becomes necessary when the original hypothesis is not to be abruptly rejected and it requires further study.

Conclusion

Data processing becomes necessary to draw meaningful inferences and it includes editing, classification, coding, tabulation, and interpretation of statistical data for data analysis and meaningful interpretation. Editing ensures correctness, error free data, adequacy and relevant information and further implies checking for completeness, accuracy and uniformity. It is of two types, namely field editing and central editing. Classification of data is resorted to bring the mass of data into manageable and meaningful homogeneous groups. Coding and transcription provide effective assistance to useful classification.

Analysis and interpretation from the penultimate stage of research operations. It calls for researcher's judgement and skill. Statistical tools are highly useful in analysing and interpretation with nominal, ordinal, interval and ratio measuremrnts. Analysis is around parametrical estimation or hypothetical testing. The task of drawing resourceful inferences and conclusions explains the significance of the various inferences from the symmetrical, reciprocal, and asymmetrical relationships. However the interpretation should guard against certain mistakes which may normally creep in, such as inappropriate comparison, faulty inferences, errors in the use of various tools, faulty generalisations, inadequate attention to individual cases.

Questions:

1. What are the components of data processing ? Briefly discuss.
2. What is editing? What are its objectives?
3. What is pre-coding? What are its advantages?
4. Describe tabulation. What are the general rules for preparing statistical tables?
5. What is transcription? Explain its uses.
6. When is a code book called Mock Code Book? Describe its use.
7. Define coding frame. State its advantages.
8. Distinguish between processing of data and analysis of data.
9. Why should there be interpretation of data? Write detailed note on its utility.
10. Give examples of various mistakes which arise in interpretation of data? What precautions do you suggest to avoid them?

Prepared by

Dr. M. Rajamani.

CHAPTER -VIII

RESEARCH REPORTS

The final step of a research is to present its results, details of its methodology, any necessary background information and the conclusions drawn from the results in some kind of report. Therefore the task of research does not end until the report is written up. The form of the report will depend on the type of reader for whom it is intended. Some readers may be concerned only with his conclusions and be relatively indifferent about the details, where as other readers may themselves be researchers and wish to study the techniques used, review the analysis to see if the data agree with the researcher's conclusions and repeat the experiment or again search the library sources to see if the conclusions can be validated. In this aspect, the report of a social scientist is intended to interest the fellow experts and the report should be formal. Research reports are commonly known as thesis and dissertations. However there is a lack of precision and general agreement in the terms thesis and dissertation. In Indian situations the report of a Ph.D. research is known as thesis and that of a work leading to M.Phil is dissertation, although the form and structure of both are virtually the same. Elsewhere the two terms are used interchangeably. In this sense, thesis is more than a larger paper. It usually represents the culmination of a substantial piece of original work over a period of at least one year. Some research replicates previous research with the object of testing the reported findings of that research or testing the relevance of findings of research builds on existing studies in order to follow up new leads or to refine or qualify the findings of earlier studies. In either case, the thesis is expected to make an original contribution to knowledge. Once the thesis is accepted the bound thesis is placed in the library of the institutions sponsoring the research. The abstracts are published and scholars throughout the world may borrow the thesis for their reference. A thesis or research report virtually becomes public property. Standards set for the research report must, therefore, be much higher.

ESSENTIALS OF A GOOD REPORT

A good report symbolises the effectiveness of the research. Necessarily, therefore, a research report should posses certain characteristics which make the report worthwhile to read. Important among them are;

1. Good thinking and effecting writing

The report must reflect a positive correlation between good thinking and effective writing. Research is not merely the accumulation, evaluation and assimilation of facts, but it is a process of rebuilding of facts into a meaningful whole. It requires patient, deep and alert thinking which alone can be the foundation of a useful report.

2. Good design

A research report is formal in nature and, therefore, it should conform to an acceptable standard of format and design. The design that is not appropriate to the target audience will not serve its purpose. A good design inspires the reader and sustain his interest at least till his interest is satisfied.

3. Clarity and Accuracy

Clarity of expressions and exposition must be the first objective of the report writer, taking priority over all else, including elegance of expression and style. The report writer should not confront the reader with numerous standard errors, significance test of results, correlation matrices, regression equations, factor loadings and the like in the conclusion stages. They may form the main subject matter. This means that presentation should not leave the leader puzzled about the writer's meaning. Clarity and accuracy are, therefore the foremost requirements for a scientifically presented research report. The author must express himself with sufficient precision such that the reader will not misinterpret what he has said. Words should be used in their generally accepted sense and sparing use of technical terms should be resorted to and such terms must be familiar to the readers. Clarity may sometimes call for the repetition of the same word more often than would be acceptable the discussion were non-scientific. Nevertheless, it is possible for a writer to present accurate information in a clear manner and still give a degree of sprightliness to his report. In every respect, a research report has no place for poetic license, colloquialism, or barbarism.

4. Reader orientation

The researcher keep constantly in view the kind of readers he is writing for, the extent of their knowledge the type of problem and question that is likely to be of interest to them and the kind of language to which they are accustomed. Whatever the likely audience, he will do well to try to avoid the jargon and style that has become common in research writing. Although the words used are those in everyday use, they are used in complicated contexts and often with specialized meanings. As a result there is sometimes confusion and often an appearance of pretentiousness and pomposity. Therefore special consideration should be given to the interest, knowledge, purpose and background of the reader for the effectiveness of the report.

5. Objectives and analytical tools

In drafting the research report, the basic objectives of the survey should be given careful consideration. No statement must find place which can affect the velocity of the objective. Similarly choice of analytical tools need be made conforming to the needs of the objectives. Tools which may have the effect of complicating the analysis and misleading interpretation of data should be avoided.

6. Adequacy of illustration

The various concepts and technical features involved in the results of the data should be illustrated with graphs and diagrams. However too many of them will impair the standard and the quality of the report and make it interesting.

7. Report should be objective

The report should be unbiased and objective fortified by facts. Maximum use of data collected in the research process must be made use of for interpretation. Too many quotations or references of other writers either create an impression of showmanship or that the researcher has done very little work of his own. The minimum references to the thoughts and concepts of others too should be properly acknowledged. Otherwise the researcher is charged for guilty of plagiarism. Thus to the extent the report is objective the standard of the work is regarded high.

8. Treating data confidentially

It means that where the research has promised to the respondents to protect their anonymity, the promise should be fulfilled at the time of writing the report. This confidentiality is not an issue if the respondents have voluntarily provided data with full awareness that they will be revealed to others. All that it implies is that the report should prelude the possibility of the respondents, identifications.

9. Form

Form is yet another essential for a good report. The usual forms adopted for presenting the evidence obtained in research are the textual tabular, and graphical. The textual form is a running narrative of the facts in an explanatory or descriptive manner. Although most of the reports will be in this form, a sincere effort should be made to minimise it to avoid tiresome repetition.

The tabular form is used for the presentation of quantitative data. Tables should be complete, meaningful in themselves and should not require a textual explanation. A formal table should be confined to a single page, if possible. It should be numbered in Arabic letters as it is conventionally used. An informal table is one which is integrated into the text discussion and is not given a number and often not even a title.

The graphic form often facilitates the presentation of data in which changes over time are stressed. It is also a good way of making clear the relative importance of subdivisions of the data, especially if time trends are important. Line graphs, maps, pictographs, etc, may suppliment either text or tabular presentation or may themselves show a relationship which needs no further explanation.

10. Revision and rewriting

Generally the report should go through three drafts. The first draft should aim at making the report as comprehensive and full of facts as possible. The second should aim at improving the language, form and style of the report authoritative by checking its footnotes, reference, bibliography etc.

Revision of the first draft may be done after some time gap. This will increase the degree of objectivity towards one's own work. Writer's personal involvement is a pre-requisite for objectivity. The time gap should not be too long because it might slacken author's concentration on the topic.

STYLE OF RESEARCH REPORT

An effective style of writing a good report serves the real purpose of research findings. A good report should combine clear thinking logical organisation and sound interpretation. Therefore the style of report implies certain features in order to maintain the readability of the report.

1. Worthwhile piece of research

It is important that the researcher feels he has something worthsaying at the result of his findings. If he does, he will probably comeforth with a report that satisfies all requirement criteria.

But if he is not convinced himself that he has a worthwhile piece of research information, he will have a difficult time in his writing.

2. Acceptable language

The research report should not only be writen in acceptable style of language, it should also be as readable as possible. This means that the presentation should not leave the reader puzzled about the writer's meaning and that the reader's interest should be kept in mind without in any way sacrificing the honesty of the report.

3. The Content of the report

It is not easy to tell writer how to present his findings in a scientific fashion. The inclusion of all details that are germane and the exclusions of those that are not frequently occurring, presents the researcher with difficult choices as to whether to include to antidotes which may add colour but which are not strictly necessary and may distract the reader from the true purpose of the report which is to give information about the research project and information to the readers to satisfy their particular interest in the project.

4. Clarity and accuracy

They are the foremost requirements for scientific writing. The researcher must ex-

press himself with sufficient precision such that the reader will not misinterpret what he had said. The report must present the materials in such a way that there are no gaps in the flow from one point to another. Words should be used in their generally accepted sense and sparing use should be made be technical terms which are familiar only to persons with a considerable background in the field. In certain disciplines commonly used terms and phrases have a special technical meaning. So clarity may call for the repetition of the same world more often than would be acceptable in the normal circumstance. Nevertheless it is possible for the researcher to present accurate information in a clear manner and still give a degree of sprightness to his report.

5. Best composition practice

The style gets enriched when the report is prepared according to the best composition practices. The report writer must be extremely careful to make correct use of such aids to readability as proper paragraphing, the use of topical sentences, illustrations and examples, short sentences and section headings. Footnote reference should be in proper form and the bibliography should be reasonably complete. A single paragraph should not deal with too many matters. If a paragraph is too short or too long, it detracts from the readability of the report. No paragraph should be longer than half a typewritten page double spaced. Very short paragraphs or single sentences paragraph should not be used at all in the type of exposition.

6. Presentation of data

The researcher should present his data in a manner that will sustain the interest of the reader while being sure to include all the evidence upon while he has based his conclusions Two questions arise in deciding how to present effectively.

1. What information is to be included?
2. What form is it be shown?

Some data may be presented in the same form as they were obtained. Whereas extensive numerical data should be grouped, classified or tabulated in some summary form. Sometimes the raw data may be too cumbersome to reproduce in the main part of the report. Sometimes not all the data are relevant for example, an analysis might be based on a relatively long interview schedule in which only a portion of the answers are pertinent. In such cases a summary may be given in the text with a reference to the raw data which would be placed in an appendix. However all the data, especially those that are original with the study must be made available in some part of the report so that the reader or evaluator or evaluator can go through them and decide whether or not he believes the writer has analysed them correctly.

7. Materials from other writers

If the data consist of materials collected by other writers, they should have the oppor-

tunity of reading and analysing the relevant materials. Footnote references to the original sources are sufficient if the sources are readily available in a library. In such cases quotations need not be unduly long. But if the sources are not readily available to the ordinary reader because it is in the private library, has not been published, has not been translated, only a few copies are in existence, the researcher should include sufficiently long quotations to avoid the charge that he picked a few sentences out of context in order to strengthen his argument.

8. Use of tables

When the data are numerical, the researcher may use a considerable number of tables in his report. Many text books on statistical techniques include rules for the preparation of tables. These rules should be carefully followed. It must be possible for a reader to follow the discussion with little or no reference to the tables. Rather the researcher should draw conclusions from the tables and assume that if the reader wants to know the bases for these conclusions he can turn to the tables and find out for himself. Proper tables add quality of readability of the report far more effectively than any other form of presentation of data. However too many tables should not make the style of the report.

Use of diagrams and graphs

Diagram means drawing, design, or plan to explain or illustrate something, while graph means diagram consisting of a line or lines, whether stright or curved, showing the variation of two quantities. They are used in research reports to convey information more impressively. While diagrams are not bound by two axes rules and can have many dimensions depending upon the choice and requirements, graphs are strictly to follow the two line rules and scale rules. However representation of numerical volumes on diagrams proportionately to the size of the various phenomenon being presented in quite common.

Importance of Diagrams

"Diagrams register a meaningful impression almost before we think", M.T. Moroney diagrams positively encourage the meaning behind them. Following are a few important points derived from diagrams.

Diagrams present an attractive and elegant picture about the facts.

They form visual impact on the minds of the reader.

The data are made simple and intelligible by carefully drawn diagrams.

Diagrams depict the characteristics far better than any other mode of presentation.

On similar grounds, they posses certain obvious limitations.

1. The use of some diagrams is only for experts.

2. They are not to be used when comparison either not possible or not necessary.
3. Diagrams can at best be supplement to the tabular presentations and are not alternative to them.
4. Diagrammatic presentation deals only with approximate values and as such precision is sacrified.
5. Too many details cannot be presented through diagrammes without loss of Clarity.
6. All diagrams are not simple and straight forward. Multidimensional diagrams are difficult to understand.
7. Diagrams can be analysed only mentally and are not amenable to further statistical treatments.

Features of a good diagram

Diagrams can be effective only when they are drawn with the following features:

1. They should ensure attractive presentation. Their very purpose is to make a visual impact on the viewer.
2. Every diagram should have an attractive and informative title and sub-titles whereever necessary.
3. The sizes and proportion must be based on the size of the pages and space available in the report.
4. The scale of presentation need to be appropriate keeping in view the magnitudes be displayed and the space available in the page in which it is presented.
5. Footnotes must be carefully appended to clarify or elucidate any matter when required. Similarly sources notes are also equally important. Each diagram must be given a number for ready reference in the report and comparative analysis.
6. Of the features the most important one is its simplicity. They should be easily understood even by a lay man without any mathematical or statistical background.

Types of diagrams

The diagrams are of many types as they are usually classified under the following heads:

1. One-dimensional diagram
2. Two-dimensional diagram
3. Three-dimensional diagram
4. Pictograms and cartograms

Bar diagrams are examples of uni-dimensional or one-dimensional diagrams. They may be simple, multiple, component and percentage diagrams and broken bar diagrams,

Gantt charts and flowcharts.

Rectangles, squares and circles are of two dimensional type, whereas cubes, cylinders and spheres form three dimensional group of diagrams. In addition to the above, various kinds of picto-grams and cartograms are used in research reports.

Graphic Presentation

Points and lines of various kinds are used to represent data strictly adhering to the scale rules. When properly, constructed they show information that might otherwise be lost amidst the details of numerical tabulations.

Merits of graph

1. Graphical presentations render complex data simple and easily understandable.
2. They give attractive, interesting and impressive view. The features of data become visible at a glance. They save time and labour by maintaining the readability of the report.
3. Graphs facilitate comparisons easy and effective.
4. Even people without mathematical or other technical knowledge can understand and appreciate the data represented by them.
5. Graphs help ascertaining and computing certain statistical measures such interpolation, extrapolation, and forecasting median, mode, percentuses etc.

Limitations

Graphic presentation has the following drawbacks also:

1. In cases of curvi-linear graphs, only tendencies and fluctuations are revealed and actual values are not known.
2. Complete accuracy is not possible on a graph.
3. Graphs cannot be quoted to support certain statements in the research report.
4. Not all the characteristics can be depicted on a graph.

Features of a graph

1. Every graph must have a clear and comprehensive title so that facts represented are revealed clearly.
2. Structural framework should carefully designed.
3. The choice of scale should be so made as to accommodate the whole data.
4. Wherever and whenever required, false base may be relative to its size.
5. For showing proportional or relative changes, ratio or logarithmic scale may beused.
6. If more than one line is plotted on the same graph, it is necessary to distinguish them by varied patterns of line, say thicker, thinners, coloured lines.
7. The scale caption for X axis and Y axis may be placed at central places of the concerned axis.

8. Suitable index should be given to show the scales and the meaning of different curves.
9. The sources note should be indicated at the end of the graph.
10. Every graph need be given a number for easy reference and quick identification.

In consideration of these facts about diagrams and graphs, the researcher should use his diligence as to the choice of relevant and appropriate kind of diagrams and graphs.

Format and Mechanisms

There are a number of format specifications for research report purposes, since reports vary in length and type. The results of a research investigation may be presented in a number of ways, such as technical report, a popular report, an article, a monograph or at times even in the form of oral presentation. A popular report is used if the research results have policy implication. Generally accepted format for a research report is quite often following a rigid pattern with minimum changes and modifications in different cases and institutions of research. By following stringent format requirements, the writer can not only systematise and structure his own thinking in terms of the theme, unity and interpretation of his work by others.

In content, the generally accepted report consists of three main parts, viz., the preliminaries the text and the reference materials. Each of these three main parts may consist of several subsections as required by the nature of the research field and the outcome.

I. The preliminaries

The sub-divisions of this part are:

i) TitlePage

ii) Preface, including acknowledgements (if desired or necessary).

iii) Table of contents iv) List of tables v) List of figures and illustrations

11. The Text

The sub-parts of this major part are:

i) Introduction
ii) Main body of the report iii) Conclusion

III. The Reference Material:

i) Bibliography

ii) Appendixes

iii) Index, if any

Most universities and colleges prescribe their own form, but all do not differ too

much from each other. The title page for thesis, dissertations and research papers should include the title of the thesis, name of the researchers, name of the institution to which the thesis is submitted, the degree for which it is submitted, name of the department, and month and the year in which the thesis is submitted. Where the title is to long, the subsequent lines may be centred on one line, an inverted phrases. It is not necessary too underline titles or include them within inverted commas. Below the title, every line of the material may be centred or balanced against the left and right margins of the page; in the title page is printed, only the title may be in a larger font whereas all over lines should be in uniform font. All that is required is decent appearance to give image of the report to the reader. A specimen thesis or dissertation title page is as follows :

RESTRICTIVE TRADE PRACTICES POLICY IN INDIA

By

M. RAJAMANI, M.Com., M.Phil.,

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the University of Madras.

Guide and Supervisor

Dr. D. Amarchand

June, 1983

In certain universities, two certificates are insisted to be presented one statement from the researcher undertaking the responsibility of original work and the other from the guide and supervision certifying the originally of the work on the basis of the earlier statement from the researcher.

EXAMPLES

1. Certificate of the candidate

STATEMENT BY THE CANDIDATE

1, M. RAJAMANI, hereby state that the thesis RESTRICTIVE TRADE PRACTICES IN INDIA submitted to the university of Madras, Chepauke, Madras - 600 005 for the award of the degree of Doctor of Philosophy in commerce is my original work and no part of this dissertation has been submitted for the award of any other degree, diploma, fellowship or any other such title.

Place :

Signature

Date :

(M. RAJAMANI)

2. Certificate issued by the supervisor

CERTIFICATE

This is to certify that the thesis "RESTRICTIVE TRADE PRACTICES IN INDIA" is a record of research work done during 1980 - 82 by Thiru. M. Rajamani, submitted to the university of Madras in partical fulfilment of the requirements of the degree of Doctor of Philosophy in commerce and that the thesis has not previously formed the basis for the award to the candidate of any degree, diploma, associateship, fellowship or other similar title.

The thesis represents an independent work on the part of the candidate.

Place : Madras **(D. Amarchand)**

Date : 30.6.1983 Supervisor.

Both the certificates may be put in separate pages immediately after the title page. Preface

The preface is the next sub-part to the preliminary section. It may include as general statement of the objectives of the study, a brief resume of the background, scope, purpose, general nature of the research upon which the report is based and acknowledgements. If this part is confined only to acknowledgements it may be titled as 'Acknowledgements' instead of being titled as preface. In order to obtain a clear idea of what is included in a preface or acknowledgements thesis and dissertations already submitted and available in the libraries maybe consulted. In all instances scholarly honesty demands that assistance and help received from different persons and institutions be acknowledged always within the confines of simplicity and tact.

Table of Contents

The table of contents include the sub-divisions of all the three main parts. Generally separate type of digits of numbers are used to indicate the page numbers of the subdivisions of the preliminaries and a different kind for the rest of the part. Care should be exercised that the titles of chapters and captions of sub-divisions within the chapters correspond exactly with those included in the body of the report. It is only optional whether the preliminaries are entered in the table of contents. The purpose of a table of contents is to provide an analytical overview of the materials included the report together with the sequence of presentation. A brief model is presented here for understanding.

TABLE OF CONTENTS

Subdivisions of Chapters may also be numbered as :

II. A SOCIO - LANGUAGE APPROACH 40

2.1

2.2

and so on.

List of Tables

After the table of contents, a list of tables must find place. It is also presented in a separate pages. Suggested format is :

LIST OF TABLES

Tables	Page
Total Population Distribution	26
Working Population	54
Employment in Mixing	71

List of figures

After the list of tables, list of figures is presented. Normally Arabic numerals are used for numbering. If the figures are 15 figures, 7 maps, 4 Photographs, separate list may be prepared and presented one after another, each in a separate page with suitable titles, Example is:

LIST OF FIGURES

Figure	Page
1. Export-Import Cycle	10
2. Export-Import India etc.	21

The Text

The text is the most important part of the report. The writer should devote greater part of his energies to a careful organisation and presentation of his findings. The text itself is usually structured in three sections,

1. the introduction
2. the major report of the study
3. the conclusions and recommendations.

1. Introduction

As the very title indicates, this is the part which introduces the research and its outcome to the reader. If introductions are dull, aimless, confused, rambling and lacking in precision, direction and specificity, there will be little incentive for the reader to sustain his interest. It contains:

a. A complete and concise statement of the problem being investigated or the general purpose and objectives of the study.

b. A justification for the study establishing the importance of the problem.

c. A resume of the history and present status of the problem with a concise critical review of literature and of previous studies into closely related problems.

d. A brief statement of the methodology, sources of data and a proposed statistical treatment.

e. A preview of the organisation of the rest of the report in the form of chapter arrangements. Introduction is one compact chapter in many instance and in more than one chapter in certain research reports.

2. Major Part of the Report :

The part consists of the analytical and argument portion of the report. There are certain principles to be followed in structuring this part. They are:

i) Organise presentation of the argument of findings in a logical and orderly manner. developing the aims stated are implied in the introduction.

ii) Substantiate arguments or findings.

iii) Be accurate in documentation.

Every effort should be made to write clearly and forcefully within a logical framework. This framework is provided in the research report by a division of the materials into willdefined chapters.

3. Conclusion

The conclusion plays an important part of tying together the whole report. In a summary form, the developments of the previous chapters are restated, important findings discussed and conclusions drawn from the whole study. In addition, a list of unanswered questions that have occured in the course of the study and which require further research beyond the limits of the project being reported, is presented. The conclusion must leave the reader with the impression of completeness and of positive gain. It usually forms a separate chapter headed CONCLUSION AND RECOMMENDATIONS or some other descriptive term which finality to the report.

THE REFERENCE MATERIAL

This main part pf the reports consists of bibliography, appendizes and index.

1. Bibliography

Bibliography forms a separate but integral part of a report. If follows the main body of the text. It is the list of books and writings referred to in the process of research work and the report.

Example:

BIBLIOGRAPHY

Books

1. Thiagu. Dr. E.P. 1990 Agricultural Economics and Rural Development, Meerut: Jay Prakash Nath & Co., etc.

Every item is serially numbered and arranged in the alphabetical order of the authors. Where it becomes necessary that references of texts and journals have been made, the bibliography may be presented separately titled as books and journals.

2. **Appendixes**

It is usual to include in appendixes such matters as original data, tables that present supporting evidences, tests that have been constructed by the researcher. Each appendix should be clearly separated from the next and listed in the table of contents.

3. **Index**

If an index is included at the end of the report, it follows the appendixes, and in the absence of appendix, the bibliography. An index is not required for a written assignment or for an un-published thesis. If the thesis is subsequently published as a book; monograph or bulletin, an index is necessary for any work of complexity in order to facilitate easy reference.

MECHANISMS FOR PRACTICE

They include guidelines to be followed in presenting the materials in the report.

1. **Chapter divisions and subdivisions**

There are many combinations of the headings and subheadings. The following examples illustrate three, four and five levels of sub-division within a chapter.

Three sub-divisions:

1. Centred heading
2. Side heading and
3. Paragraph heading

Four sub-divisions:

1. Centred heading
2. Side heading
3. Paragraph heading and
4. Sub-paragraph heading

Five sub-divisions:

1. Centred heading
2. Sideheading
3. Sub-side heading
4. Paragraph heading
5. Sub-Paragraph heading

There are certain conventions for typing and spacing of chapter headings. Suggestions has been made to put a stop after the paragraph heading and run material after typing spacer.

Chapter Headings

The following format is recommended

CHAPTERV	Two inches or Five centimeters from top
TITLE	Double space
MATERIALS	Triple space

Quotations

There are two possible ways of presenting quotatitions.

1) as in the text and
2) in an indirect form.

1. Paper views, "The Direction of hexogonal axis in the direction of easy magnetization".
2. Peter's view is that "the direction of hexogonal axis ill the direction of easy magnetization".

Footnotes

The quotations inside the text in a page is acknowledged at the foot of the page or at the end of the chapter after numbering serially each such quotation. The convention followed is name of the author, year of publication, title of the book and the publishers address and name. Punctuation and presentation may be noted from the following examples.

1. Nicholas, Dr. R. 1983. The Story of Esther. London: Cassel Publishers, P. 125.
2. Ibid.,P.187.
3. Hudson, Loc. cit
4. Doole., op. cit, PP 238 - 239

Title of the book is unusually underlined.

Tables and Figures

Every table or diagram should have a title. Format of a table consists of the table number, little, box heads, and column numbers.

An Example:

Table 1

Area is square Miles of the States and Mainland Territories of

Austrailia

States and Mainland Territories	Area (Sq. Miles)
Western Austrailia	975,920
Queensland	667,000

Source:

Note:

Top line should be in double line if typed or thickers if printed.

For figures, title and the number should be after the figures.

An example:

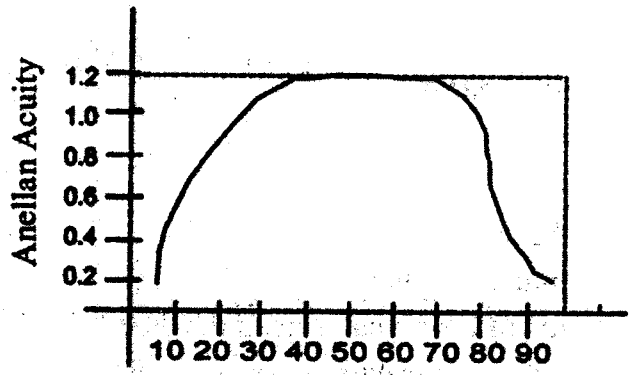

Figure 1.1

The Age variation of Mean Snellan Visual Acuity.

Criteria for Judging the Research Report

It may be useful to the reporter, especially of a thesis, to be able to measure his work against fairly accepted criteria so that he may be able to detect both the strong and the weak points of his report. Normally what constitutes a good thesis is not agreed upon uniformly by thesis supervisors and evaluators. Therefore the following may be a digest of suggestions by a number of authors:

Title

It should be brief, but still suggest the problem that the writer has chosen.

Problem Description

1. The problem should be worthy of the research efforts. It should be clearly explained and delimited.

2. To understand the problem better and to attempt a solution more intelligently, it should be broken down into sub problems or questions.
3. Previous works which are relevant to the problems at hand should be reviewed and appraised
4. It should constitute a definite statement of the objectives of the study.

Methodology

1. The procedure by which the research has been conducted should be adequately explained.
2. The methodology must be appropriate to the problem and to the data.
3. The data must be collected carefully and bias avoided.

Treatment of the data

1. The data to be accurate, adequate, relevant and pertinent to a logical presentation and not a mere collection of facts.
2. The presentation of data should be objective and unbiased.
3. The analytical procedure must lead towards a solution.
4. Any standards of comparison which are utilised are to be valid.

Summary and Conclusions

1. No new materials should be introduced in this section. Its purpose is to digest the previous presentation and state conclusions, evaluations, generalisations, and suggestions for actions.
2. The summary positions should briefly but adequately describe the problem and this particular effort at its solution.
3. All the conclusions must be based on data which have been fully presented.
4. The conclusions must be based on evidence only. They are not to be merely the researchers opinion.
5. Limitations on the degree of generalisation which the conclusions permit should be clearly stated.
6. All the recommendations should be made judiciously,
7. Areas for further researcher ought to be included.

General

1. The report should be clear and logical when viewed as an entity.
2. The format should be such that it contributes to holding the reader's attention and makes it easy to follow the various discussion.
3. The style of presentation must be precise, simple and direct.

The criteria listed above serve the purpose of a check list for the evaluation of the report. The list of criteria is not elaborate, but covers a larger portion through which the report can be judged for its validity, adequacy and utility.

Questions

1. Discuss the chief features of a good research report.
2. What are the factors a researcher should bear in mind for maintaining the style of the report?
3. Discuss the importance of diagrams and graphs in making the report complete.
4. Elucidate the merits and demerits of a graph.
5. Give the method of a generally accepted a research report. Explain their components.
6. What are the generally accepted rules in presenting the various component parts of a research thesis?
7. What are the various criteria for judging the validity of a report?
8. Give the format of the first page of a Ph.D. thesis.
9. Report writing is the most difficult job in a research. Explain what precautions would you keep in mind while drafting a research report.
10. Use of diagrams and graphs adds clarity to the report. Discuss.

Prepared by
Dr. M. Rajamani.