Annexure-03

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BUSINESS RESEARCH

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BUSINESS RESEARCH METHODS

INTRODUCTION

The word 'Research' is derived from the French word, 'Researcher' meaning 'to search back". A man in his social, economic, educational, political and business life faces many problems.

The term 'Research' consists of two words:

Research = Re + Search

'Re' means again and again and 'Search' means to find out something.

Therefore, research means to observe the phenomena again and again from different dimensions. For example there are many theories of learning due to the observation from different dimensions. The research is a process of which a person observes the phenomena again and again and collects the data and on the basis of data he draws some conclusions.

Research is oriented towards the discovery of relationship that exists among phenomena of the world in which we live. The fundamental assumption is that invariant relationship exists between certain antecedents and certain consequents so that under a specific set of conditions a certain consequents can be expected to follow the introduction of a given antecedent. Research refers to a search for knowledge. Research is an art of scientific investigation. Research is a systematic and objective process of gathering, recording and analyzing data for aid in making business decisions. Business research is a systematic and organized effort to investigate a specific problem encountered in the work setting that needs a solution.

DEFINITION OF RESEARCH

In the Encyclopedia of Social Sciences, D. Slesinger and M. Stephension (1930) defined research as "the manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in the construction of theory or in the practice of an art".

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

Francis Rummel: “Research is a careful inquiry or examination to discover new information or relationships and to expand and to verify existing knowledge."

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

The Advanced Learner‟s Dictionary of Current English lays down the meaning of research as, “a careful investigation or inquiry specially through search for new facts in any branch of knowledge”.

Redman and Mory define research as a,” Systematized effort to gain new knowledge”. Some people consider research as a movement, a movement from the known to the unknown.

According to Clifford woody, research comprises “defining and redefining problems, formulating hypothesis or suggested solutions collecting, organising and evaluating data, making deductions and reaching conclusions; to determine whether they fit the formulating hypothesis”.

Thus, research is an original addition to the available knowledge, which contributes to its further advancement. It is an attempt to pursue truth through the methods of study, observation, comparison and experiment. In sum, research is the search for knowledge, using objective and systematic methods to find solution to a problem.

OBJECTIVES OF RESEARCH

The objective of research is to find answers to the questions by applying scientific procedures. In other words, the main aim of research is to find out the truth which is hidden and has not yet been discovered. Although every research study has its own specific objectives, the research objectives may be broadly grouped as follows:

1. To gain familiarity with a phenomenon or to achieve new insights into it (studies with this

object in view are termed as *exploratory* or *formulative* research studies);

2. To portray accurately the characteristics of a particular individual, situation or a group (studies with this object in view are known as *descriptive* research studies);
3. To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as *diagnostic* research studies);
4. To test a hypothesis of a causal relationship between variables (such studies are known as
hypothesis-testing research studies).

MOTIVATION IN RESEARCH

The possible motives for doing research may be either one or more of the following:
1. Desire to get a research degree along with its consequential benefits;
2. Desire to face the challenge in solving the unsolved problems, i.e., concern over practical
problems initiates research;
3. Desire to get intellectual joy of doing some creative work;
4. Desire to be of service to society;
5. Desire to get respectability.

However, this is not an exhaustive list of factors motivating people to undertake research studies. Many more factors such as directives of government, employment conditions, curiosity about new things, desire to understand causal relationships, social thinking and awakening, and the like may as well motivate (or at times compel) people to perform research operations.

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" is a famous Hudson Maxim in context of which the significance of research can well be understood. Increased amounts of research make progress possible.

Research inculcates scientific and inductive thinking and it promotes the development of logical habits 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 in solving operational problems. Research, as an aid to economic policy, has gained added importance, both for government and business.

Research provides the basis for nearly all government policies in our economic system. For instance, government's budgets rest in part on an analysis of the needs and desires of the people and on the availability of revenues to meet these needs. The cost of needs has to be equated to probable revenues and this is a field where research is most needed. Through research we can devise alternative policies and can as well examine the consequences of each of these alternatives. 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 facets of the country's existence and most of these will be related directly or indirectly to economic conditions. The plight of cultivators, the problems of big and small business and industry, working conditions, trade union activities, the 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. Another area in government, where research is necessary, is collecting information on the economic and social structure of the nation. Such information indicates what is happening in the economy and what changes are taking place. Collecting such statistical information is by no means a routine task, but it involves a variety of research problems. These days nearly all governments maintain large staff of research technicians or experts to carry on this work. Thus, in the context of government, research as a tool to economic policy has three distinct phases of operation, viz.,

(i) Investigation of economic structure through continual compilation of facts;

(ii) Diagnosis of events that are taking place and the analysis of the forces underlying them; and (iii) the prognosis, i.e., the prediction of future developments.

Research has its special significance in solving various operational and planning problems of business and industry. Operations research and market

research, along with motivational research, are considered crucial and their results assist, in more than one way, in taking business decisions. 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. In other words, it is concerned with the determination of motivations underlying the consumer (market) behaviour. All these are of great help to people in business and industry who are responsible for taking business decisions. Research with regard to demand and market factors has great utility in business. Given knowledge of future demand, it is generally not difficult for a firm, or for an industry to adjust its supply schedule within the limits of its projected capacity. Market analysis has become an integral tool of business policy these days. Business budgeting, which ultimately results in a projected profit and loss account, is based mainly on sales estimates which in turn depends on business research. Once sales forecasting is done, efficient production and investment programmes can be set up around which are grouped the purchasing and financing plans. Research, thus, replaces intuitive business decisions by more logical and scientific decisions.

Research is equally important for social scientists in studying social 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 and also has practical utility for the social scientist to know for the sake of being able to do something better or in a more efficient manner. Research in social sciences is concerned both with knowledge for its own sake and with knowledge for what it can contribute to practical concerns. “This double emphasis is perhaps especially appropriate in the case of social science. On the one hand, its responsibility as a science is to develop a body of principles that make possible the understanding and prediction of the whole range of human interactions. On the other hand, because of its social orientation, it is increasingly being looked to for practical guidance in solving

immediate problems of human relations." In addition to what has been stated above, 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 careerism 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 generalisations of new theories.

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

Criteria of Good Research

Whatever may be the types of research works and studies, 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 detail 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.

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 provides 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.

TYPES OF RESEARCH

The basic types of research are as follows:

(i) Descriptive vs. Analytical Research

Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. In social science and business research we quite often use the term ***Ex post facto research*** for descriptive research studies. The main characteristic

of this method is that the researcher has no control over the variables; he can only report what has happened or what is happening. Most ex post facto research projects are used for descriptive studies in which the researcher seeks to measure such items as, for example, frequency of shopping, preferences of people, or similar data. Ex post facto studies also include attempts by researchers to discover causes even when they cannot control the variables. The methods of research utilized in descriptive research are survey methods of all kinds, including comparative and correlational methods. **In *analytical research***, the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.

(ii) Applied vs. Fundamental Research

Research can either be applied (or action) research or fundamental (to basic or pure) research. **Applied research** aims at finding a solution for an immediate problem facing a society or an industrial/business organisation, whereas **fundamental research** is mainly concerned with generalisations and with the formulation of a theory. "Gathering knowledge for knowledge's sake is termed 'pure' or 'basic' research." Research concerning some natural phenomenon or relating to pure mathematics are examples of fundamental research. Similarly, research studies, concerning human behaviour carried on with a view to make generalisations about human behaviour, are also examples of fundamental research, but research aimed at certain conclusions (say, a solution) facing a concrete social or business problem is an example of applied research. Research to identify social, economic or political trends that may affect a particular institution or the copy research (research to find out whether certain communications will be read and understood) or the marketing research or evaluation research are examples of applied research. Thus, the central aim of applied research is to discover a solution for some pressing practical problem, whereas basic research is directed towards finding information that has a broad base of applications and thus, adds to the already existing organized body of scientific knowledge.

(iii) *Quantitative vs. Qualitative:*

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 research**, is concerned with 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 (i.e., why people think or do certain things), we quite often talk of 'Motivation Research', an important type of qualitative research. This type of research aims at discovering the underlying motives and desires, using in depth interviews for the purpose. Other techniques of such research are word association tests, sentence completion tests, story completion tests and similar other projective techniques. Attitude or opinion research i.e., research designed to find out how people feel or what they think about a particular subject or institution is also qualitative research. Qualitative research is especially 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 in practice is relatively a difficult job and therefore, while doing such research, one should seek guidance from experimental psychologists.

(iv) ***Conceptual vs. Empirical:***

Conceptual research is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. On the other hand, **empirical research** relies on experience or observation alone, often without due regard for system and theory. It is data-based research, coming up with conclusions which are capable of being verified by observation or experiment.

We can also call it as experimental type of research. In such a research it is necessary to get at facts firsthand, at their source, and actively to go about doing certain things to stimulate the production of desired information. In such a research, the researcher must first provide himself with a working hypothesis or guess as to the probable results. He then works to get enough facts (data) to prove or disprove his hypothesis. He then sets up experimental designs which he thinks will manipulate the

persons or the materials concerned so as to bring forth the desired information. Such research is thus characterised by the experimenter's control over the variables under study and his deliberate manipulation of one of them to study its effects. Empirical research is appropriate when proof is sought that certain variables affect other variables in some way. Evidence gathered through experiments or empirical studies is today considered to be the most powerful support possible for a given hypothesis.

(v) ***Some Other Types of Research:***

All other types of research are variations of one or more of the above stated approaches, based on either the **purpose of research, or the time required** to accomplish research, **on the environment** in which research is done, or on the basis of some other similar factor. Form the point of view of time, the research either as ***one-time research or longitudinal research*****.** In the former case the research is confined to a single time-period, whereas in the latter case the research is carried on over several time-periods. Research can be ***field-setting research or laboratory research or simulation research*****,** depending upon the environment in which it is to be carried out. Research can as well be understood as ***clinical or diagnostic research*****.** Such research follow case-study methods or in depth approaches to reach the basic causal relations. Such studies usually go deep into the causes of things or events that interest us, using very small samples and very deep probing data gathering devices. The research may be *exploratory* or it may be formalized. The objective of exploratory research is the development of hypotheses rather than their testing, whereas formalized research studies are those with substantial structure and with specific hypotheses to be tested. ***Historical research*** is that which utilizes historical sources like documents, remains, etc. to study events or ideas of the past, including the philosophy of persons and groups at any remote point of time. Research can also be classified as ***conclusion-oriented*** and ***decision-oriented.*** 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 wishes. ***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 inclination. Operations research is an 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.

RESEARCH DESIGN

A research design is the plan or framework used to conduct a research study. It involves outlining the overall approach and methods that will be used to collect and analyze data in order to answer research questions or test hypotheses.

According to Kerlinger :

"Research design is the plan, structure, and strategy of investigation conceived so as to obtain answers to research questions and to control variance".

Features of a Good Research Design

Objectivity :

Objectivity refers to the ability of the research instruments to give conclusions that are free from observer's personal biases. A good research design should be able select those instruments only that provide objective conclusions. Usually, it is believed that maintaining objectivity is pretty easy, but it proves to be difficult during execution of research and data analysis.

Reliability :

Another essential feature of a good research design is the reliability of responses. The instruments used in research should be able to provide similar responses to a question asked from a respondent. If the response varies, the instrument is considered unreliable. In other words, reliability of research design is measured in terms of consistency in responses.

Validity :

An important characteristic of a good research design is its ability to answer the questions in the way it was intended to. It should focus on the objective of the research and make specific arrangements or plan for achieving that objective.

Generalisability :

A research design is said to be generalisable if the outcome of the research is applicable on a bigger population from which the sample is selected. A research design can be made generalisable by properly defining the population properly, selecting the sample carefully, analyzing the statistical data appropriately, and by preparing it methodologically.

Therefore, the more the outcomes are generalisable, more efficient is the research design.

Sufficient Information:

Any research is conducted to gain insight of the hidden facts, figures and information. The research design should be able to provide sufficient information to the researcher so that he can analyse the research problem in a broad perspective. The research design should be able to identify the research problem and research objective.

Importance of Research Design

Reduces Cost :

Research design is needed to reduce the excessive costs in terms of time, money and effort by planning the research work in advance.

Facilitate the Smooth Scaling :

In order to perform the process of scaling smoothly, an efficient research design is of utmost importance. It makes the research process effective enough to give maximum relevant outcome in an easy way.

Helps in Relevant Data Collection and Analysis :

Research design helps the researchers in planning the methods of data collection and analysis as per the objective of research. It is also responsible for the reliable research work as it is the foundation for entire research. Lack of proper attention in preparation of research design can harm the entire research work.

Assists in Smooth Flow of Research Operations :

Research design is necessary to give better and effective structure to the research. Since all the decisions are made in advance, therefore, research design facilitates the smooth flow of research operations and reduces the possible problems of researchers.

Helps in Getting Reviews from Experts :

Research design helps in developing an overview about the whole research process and thus assists in getting responses and reviews from different experts in that field.

Provides a Direction to Executives :

Research design directs the researcher as well as the executives involved in the research for giving their relevant assistance.

Factors Affecting Research Design

Various factors that affect research design are as follows :

Research Questions :

Research questions perform an important role in selecting the method to carry-out research. There are various forms of research designs which include their own methods for collecting data.

Time and Budget Limits :

Researchers are bound with restricted amount of time and budget to complete the research study. The researcher can select experimental or descriptive research when the time and budget constraints we favorable to him for the detailed study. otherwise exploratory research design can be adopted when the time is limited.

Research Objective :

Every research is carried out to obtain the results which help to achieve some objectives. This research objective influences the selection of research design. Researcher should adopt the research design which is suitable for research objective and also provides best solution to the problem along with the valuable result.

Research Problem :

Selection of the research design is greatly affected by the type of research problems. **For example,** the researcher selects experimental research design to find out cause and-effect relationship of the research problem. Similarly, if the research problem includes in depth study, then the researcher generally adopts experimental research design method.

Personal Experiences :

Selection of research design also depends upon the personal experience of researchers. **For example,** the researcher who has expertise in statistical analysis would be liable to select the quantitative research designs. While, those researchers who are specialists in theoretical facets of research will be forced to select qualitative research design.

Target Audience :

The type of target audience plays very important role in selection of research design. Researcher must consider the target audience for which the research is carried-out. Audiences may either be general public, business professionals or government. **For example,** if the research is proposed for general public, then the researcher should select qualitative research design. Similarly, quantitative research design would be appropriate for the researcher to introduce the report in front of the business experts.

HYPOTHESIS

INTRODUCTION

A hypothesis is a formal tentative statement of the expected relationship between two or more variables under study. A hypothesis helps to translate the research problem & objectives into a clear explanation or prediction of the expected results or outcomes of the research study.

A clearly stated hypothesis includes the variables to be manipulated or measured, identifies the population to be examined, & indicates the proposed outcome for the study.

DEFINITION

"Hypothesis is a tentative prediction or explanation of the relationship between two variables. It implies that there is a systematic relationship between an independent & a dependent variable".

Good & Hatt defined "Hypothesis as a shrewd guess or inference that is formulated & provisionally adopted to explain observed facts or conditions & to guide in further investigation".

IMPORTANCE OF HYPOTHESIS IN RESEARCH

- Hypotheses enables the researcher to objectively investigate new areas of discovery. Thus, it provides a powerful tool for the advancement of knowledge.
- Hypotheses provides objectivity to the research activity. It also provides directions to conduct research such as defining the sources & relevance of data.
- Hypotheses provides clear & specific goals to the researchers. These clear & specific goals provide the investigator with a basis for selecting sample & research procedures to meet these goals.
- Hypotheses provides link between theories & actual practical research.
- It provides a bridge between theory & reality.
- A hypothesis suggests which type of research is likely to be most appropriate. As it is a tentative statement of anticipated results, it guides the researcher towards the direction in which the research should proceed.
- It stimulates the thinking process of researcher as the researcher forms the hypothesis by anticipating the outcome.
- It also determines the most appropriate research designs & techniques of data analysis.
- Hypotheses provides understanding to the researchers about what expect from the results of the research study.

- It serves as framework for drawing, conclusions of a research study. Without hypotheses, research would be like aimless wandering.

CHARACTERISTICS OF GOOD HYPOTHESIS

Conceptual clarity:

Hypothesis should consist of clearly defined & understandable concepts. It should be stated in very terms, the meaning & implication of which cannot be doubted. To facilitate the conceptual clarity, hypothesis can be stated in declarative statement, in present tense.

Empirical referents:

Research must have an ultimate empirical referent. No usable hypothesis can embody moral judgments. A good hypothesis must have empirical basis from the area of enquiry.

Objectivity:

Hypothesis must be objective, which facilitates objectivity in data collection & keeps the research activity free from researcher value - judgment.

Specificity:

It should be specific, not general, & should explain the expected relations between variables. For example, regular yoga reduces stress.

Relevant:

The hypothesis should be relevant to the problem being studied as well as the objectives of the study. Hypothesis must have relevance with theory under test in a research process.

Testability:

Hypothesis should be testable & should not be a moral judgment. It must be directly/indirectly observable & measurable. The researcher can set up a situation that permits one to assess if it is true or false. It must be verifiable. For example, a statement such as ‘bad partners produce bad children’. This sort of hypothesis cannot be tested.

Consistency:

A hypothesis should be consistent with an existing body of theories, research findings, & other hypotheses. It should correspond with existing knowledge.

Simplicity:

A hypothesis should be formulated in simple & understandable terms. It should require fewer conditions & assumptions.

Availability of techniques:

The researchers must make sure that methods are available for testing their proposed hypotheses

Purposiveness:

The researcher must formulate only purposeful hypotheses, which has relevance with research problem & objectives.

Verifiability:

A good hypothesis can be actually verified in practical terms.

Profundity of effect:

A good hypothesis should have profound effect upon a variety of research variables.

Economical:

The expenditure of money & the time can be controlled if the hypotheses underlying the research undertaken is good.

SOURCES OF HYPOTHESIS

Theoretical or conceptual frameworks

The most important sources of hypotheses are theoretical or conceptual frameworks developed for the study. Through a deductive approach these hypotheses are drawn from theoretical or conceptual frameworks for testing them. For example, Roy's adaptation Model is used in a research study, where a hypothesis can be drawn from a concept of the theoretical mode that 'patient's adaptation to a chronic illness depends on availability of social support for them.'

Previous Research

Findings of the previous studies may be used for framing the hypotheses for another study. For example, in a small sample descriptive study, a researcher found that a number of patients admitted with coronary artery disease had increased body mass index.

Real-Life Experiences

Real-life experiences also contribute in the formulation of hypotheses for research studies. For example, Newton had a life-changing experience of the falling of an apple & formulated a hypothesis that earth attracts all the mass towards its centre, through several researchers were conducted before generating a law of central gravity.

Academic Literature

Academic literature is based on formal theories, empirical evidences, experiences, observation, & conceptualizations of academicians. These literatures may serve as good sources for formulating hypotheses for research studies**.**

TYPES OF HYPOTHESIS

Simple & Complex Hypothesis

Simple Hypothesis:

- It is a statement which reflects the relationship between two variables.
- For example, 'the lower the level of hemoglobin, the higher is the risk of infection among postpartum women'.

Complex Hypothesis:

- It is a statement which reflects the relationship between more than two variables.
- For example, 'satisfaction is higher among patients who are older & dwelling in rural area than those who are younger & dwelling in urban area'.

Associative & Causal Hypothesis

Associative Hypothesis:

- It reflects a relationship between variables that occurs or exists in natural settings without manipulation.

Causal Hypothesis:

- It predicts the cause-and-effect relationship between two or more dependent & independent variables in experimental or interventional setting, where independent variable is manipulated by research to examine the effect on the dependent variable.
- The causal hypothesis reflects the measurement of dependent variable to examine the effect of dependent variable, which is manipulated by the researcher.

Directional & Non Directional Hypothesis

Directional Hypothesis:

- It specifies not only the existence, but also the expected direction of the relationship between variables.
- Directional hypothesis states the nature of the relationship between two or more variables such as positive, negative, or no relationship.
- To express the direction of relationship between variables, the directional terms are used to state the hypothesis such as positive, negative, less, more, increased, decreased, greater, higher, lower, etc.
- For examples, 'there is a positive relationship between years of nursing experience & job satisfaction among nurses.

Non-Directional Hypothesis:

- It reflects the relationship between two or more variables, but is does not specify the anticipated direction & nature of relationship such as positive or negative.
- It indicates the existence of relationship between the variables.

Null & Research Hypothesis:

Null Hypothesis :

- It is also known as statistical hypothesis & is used for statistical testing & interpretation of statistical outcomes.
- It states the existence of no relationship between theindependent & dependent variables.

Research Hypothesis :

- It states the existence of relationship between two or more variables.
- For examples, 'there is relationship between smoking & incidence of lung cancer.

METHODS OF DATA COLLECTION

INTRODUCTION:

There are various methods of collecting data are employed by social scientists. The task of data collection begins after a research problem has been defined and research design /plan chalked out.

TYPES OF DATA

1) PRIMARY DATA : Are those which are collected a fresh and for the first time and thus happen to be original in character and known as Primary data.

2) SECONDARY DATA : Are those which have been collected by someone else and which have already been passed through the statistical process are known as Secondary data.

COLLECTION OF PRIMARY DATA:

There are several methods of collecting primary data, particularly in surveys and descriptive researches. In descriptive research, we obtain primary data either through observation or through direct communication with respondents in one form or another or through personal interviews.

COLLECTION OF SECONDARY DATA:

These are already available i.e. they refer to the data which have already been collected and analyzed by someone else. Secondary data may either be published or unpublished data. Researcher must be very careful in using secondary data, because the data available may be sometimes unsuitable.

METHODS OF PRIMARY DATA COLLECTION :

OBSERVATION METHOD :

- Observation method is a method under which data from the field is collected with the help of observation by the observer or by personally going to the field.
- In the words of P.V. Young, "Observation may be defined as systematic viewing, coupled with consideration of seen phenomenon."

Advantages:

- Subjective bias eliminated (No bias information)
- Information researcher gets is Current information
- Independent to respondent's variable (as in interview and may be bias)

Disadvantages :

- It is expensive method (Time requires more)
- Limited information
- Unforeseen factors may interfere with observational task
- Respondents opinion cannot be recorded on certain subject

Types of Observation:

Structured and Unstructured Observation

- When observation is done by characterizing style of recording the observed information, standardized conditions of observation , definition of the units to be observed , selection of pertinent data of observation then it is structured observation
- When observation is done without any thought before observation then it is unstructured observation

Participant & Non Participant Observation

- When the Observer is member of the group which he is observing then it is Participant Observation
- In participant observation Researcher can record natural behavior of group , Researcher can verify the truth of statements given by informants in the context of questionnaire , Difficult to collect information can obtain through this method but in this researcher may lose objectivity of research due emotional feelings.
- When observer is observing people without giving any information to them then it is non participant observation

Controlled & Uncontrolled Observation:

- When the observation takes place in natural condition i.e. uncontrolled observation.
- It is done to get spontaneous picture of life and persons

- When observation takes place according to definite pre arranged plans, with experimental procedure then it is controlled observation generally done in laboratory under controlled condition.

INTERVIEW METHOD:

This method of collecting data involves presentation or oral-verbal stimuli and reply in terms of oral-verbal responses. This is Oral Verbal communication. Where interviewer asks questions (which are aimed to get information required for study) to respondents.

Personal Interview : The interviewer asks questions generally in a face to face contact to the other person or persons.

Merits of Personal Interview:

- Information at greater depth
- Flexibility of restructuring the Questionnaire
- Interviewer by his skill can come over resistance
- Non Response generally low
- Samples can controlled more effectively
- Personal information can be obtained by the Interviewer and can collect supplementary information about respondent's personal characteristics and environment which has value in interpreting results.

Demerits of Personal Interview:

- Supervisors have to do complex work of selecting, training and supervising the field staff.
- Systematic errors may be occurred
- Takes more time when samples are more
- Some Executive people are not approachable so data collected may be inadequate
- Respondent may give bias information
- It is an Expensive method as compared to telephone interview method.

TELEPHONIC INTERVIEWS:

- Contacting samples on telephone
- Uncommon method may be used in developed regions

Merits

- Flexible compare to mailing method
- Faster than other methods
- Cheaper than personal interview method
- Call-backs are simple and economical also
- High response than mailing method, when it is not possible to contact the respondent directly, then interview is conducted through telephone.
- Replies can be recorded without embarrassment to respondents
- Interviewer can explain requirements more easily
- No field staff is required
- Wider distribution of sample is possible

Demerits

- Little time is given to respondents
- Survey is restricted to respondents who have telephones
- Not suitable for intensive survey where comprehensive answers are required
- Bias information may be more
- It is very difficult to make questionnaire because it should short and to the point

QUESTIONNAIRE METHOD:

This method of data collection is quite popular, particularly in case of big enquiries. The questionnaire is mailed to respondents who are expected to read and understand the questions and write down the reply in the space meant for the purpose in the questionnaire itself. The respondents have to answer the questions on their own

Merits of Questionnaire

- Low cost even the geographical area is large to cover
- Answers are in respondents own word so, free from bias

- Adequate time to think for answers
- Non approachable respondents may be conveniently contacted
- Large samples can be used so results are more reliable

Demerits of Questionnaire

- Low rate of return of duly filled questionnaire
- It Can be used when respondent is educated and co operative
- It is inflexible ,omission of some questions by the respondents
- Difficult to know the expected respondent have filled the form or it is filled by someone else
- It is slowest method of data collection

Essentials of Good Questionnaire

- Questionnaire Should Short & simple
- Questions should arranged in logical sequence (From Easy to difficult one)
- Technical terms should avoided
- Some control questions which indicate reliability of the respondent (To Know consumption first expenditure and then weight or qty of that material)
- Questions affecting the sentiments of the respondents should be avoided
- Adequate space for answers should be provided in questionnaire

How to Construct a Questionnaire:

Researcher should note the following with regard to these three main aspects of a questionnaire:

- General form
- Question Sequence
- Determine the type the Questions
  - Direct Question
  - Indirect Question
  - Open Form Questionnaire
  - Closed Form Questionnaire
  - Dichotomous Questions

- Multiple Choice Questions (MCQ)

SCHEDULE METHOD:

- It is one of the important methods for the study of social problems.
- Schedules like Questionnaires but it filled by enumerator.
- Enumerators are specially appointed for filling questionnaire
- Enumerators explain the aim and objective to respondent and fill the answers in provided space

Other Methods of Data Collection

Warranty Cards:

- Post card size cards sent to customers and feedback collected through asking questions on that card.
- Distributor or Store Audits, Audits are done by distributor or manufacturer's salesperson. Observation or copying information about inventory in retail shops.
- Useful method for knowing market share, market size , effect of in store promotion.

Pantry Audits:

- From the observation of pantry of customer to know purchase habit of the people (which product, of what brand etc.)
- Questions may be asked at the time of audit

Consumer Panels:

- When pantry audit is done at regular basis, Daily record of consumption of certain customers, or repeatedly interviewed at the specific periods to know their consumption.
- Transitory consumer panels – for limited time Continuing Consumer panel for indefinite period

Use of Mechanical Device:

- **Eye Cameras:** To record eyes focus on certain sketch
- **Psycho Galvanometer:** To measure body excitement to visual stimulus
- **Motion Picture Camera:** To record movement of body at the time of purchase

SECONDARY SOURCES OF DATA:

- Publications of Central, State, Local Government, Technical and Trade journals.
- Books, Magazines, Newspaper• Reports & publications of industry, bank, stock exchange.
- Reports by research scholars, Universities and economists.

Factors to be considered before using secondary data

- Reliability of data – Who, when, which methods, at what time etc.
- Suitability of data – Object ,scope, and nature of original inquiry should be studied, as if the study was with different objective then that data is not suitable for current study
- Adequacy of data– Level of accuracy, area differences then data is not adequate for study

Selection of proper Method for collection of Data:

- Nature ,Scope and object of inquiry
- Availability of Funds
- Time Factor
- Precision Required

RESEARCH PROBLEM

INTRODUCTION TO RESEARCH PROBLEM

- A research problem is a question that researcher wants to answer or a problem that a researcher wants to solve
- Identification & formulation of a research problem is the first step of the research process.
- It is like the identification of a destination before under taking a journey
- Without a problem , research cannot proceed because there is nothing to proceed to ward.

3

- Research problem may take a number of forms , from the very simple to the very complex

Research Topic:

The broad general area expected to investigate. It is a broad idea or concept from which many problems may be delineated.

Research Problem:

A situation or circumstance that requires a solution to be described, explained, or predicted. It is an unsatisfactory situation that wants you to confront.

4

DEFINITION

- According to *Kerlinger*, 'A problem is an interrogative sentence or statement that asks what relation exists between two or more variable. The answer to question will provide what is having sought in the research.
- Research problem is a "statement of the disparity between what is known and what needs to be known"

SELECTION OF RESEARCH PROBLEM

- Any research problem does exist if the following condition are in existence:-

1. There must be an individual or a group or an organization having different types of environment.
2. There must be at lest two course of action is defined by one or more values of the controlled variable.

FORMULATION OF RESEARCH PROBLEM

SELECTION OF A RESEARCH AREA:

- Formulation of a research problem begins with selection of a broad research topic from personal experience, literature, previous research, & theories in which researcher is interested & has significance for library profession.
- For example, a researcher gets an idea to conduct a study on the Impact of library internship on MLIS Student.
- Therefore, he or she initially begins with such broad research topic.

REVIEWING LITERATURE & THEORIES:

- After getting a broad idea for research, he or she needs to review the LISc. literature & theories.
- Literature is reviewed to know what has already been done in this selected areas of research.
- Review of library theories provides an opportunity for LISc researcher to plan a research problem to contribute towards.

DELIMITING THE RESEARCH TOPIC:

- In this step, researcher proceeds from a general area of interest to more specific topic of research to conduct a study.
- For example, initially a researcher decides to conduct a study 1.on Impact of library internship on MLIS Student; later in this stage researcher limits it to specific research topic '*a study on 2.perception of MLIS Students about impact on internship in Pondicherry university* '.
- In the 1st tropic specific area is not mentioned but in 2nd tropic specific area is mentioned Pondicherry University.

EVALUATING THE RESEARCH PROBLEM

- Once researcher is clear about the specific research problem, next the research problem must be carefully evaluated for its significance, researchability, & feasibility.
- Feasibility of the research problem should be evaluated for time, cost, availability of subjects & resources and researcher's interest.

FORMULATING FINAL STATEMENT OF RESEARCH PROBLEM

- After establishing the significance, researchability, & feasibility, then researcher finally formulates a final statement of a research problem.
- A statement of research problem could be in declarative or interrogative format

COUNT...

1.Declarative format:

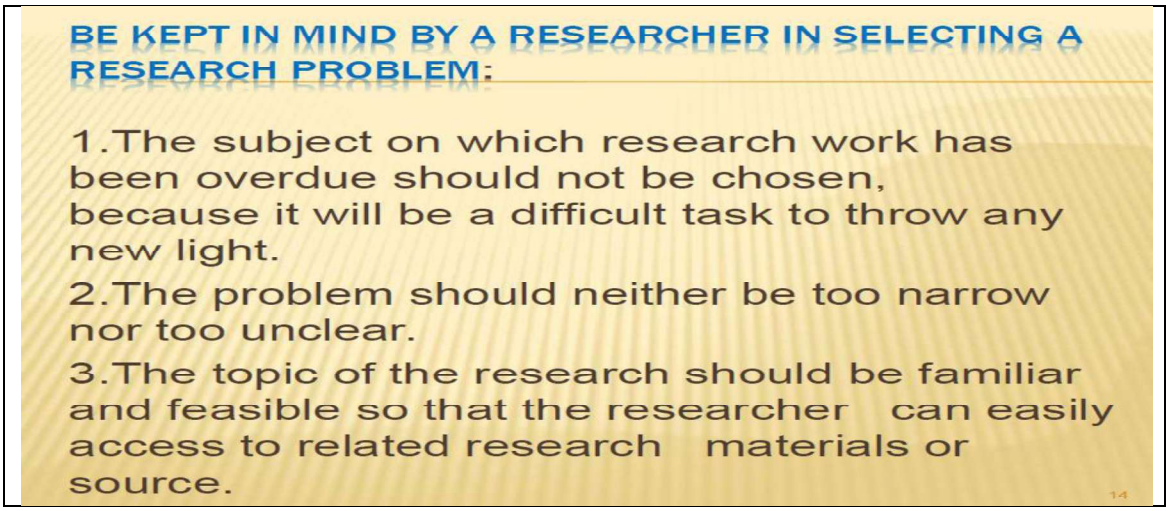
In this format, a research problem is stated in declarative statement.

e.g.- impact of library internship on MLIS student of Pondicherry University.

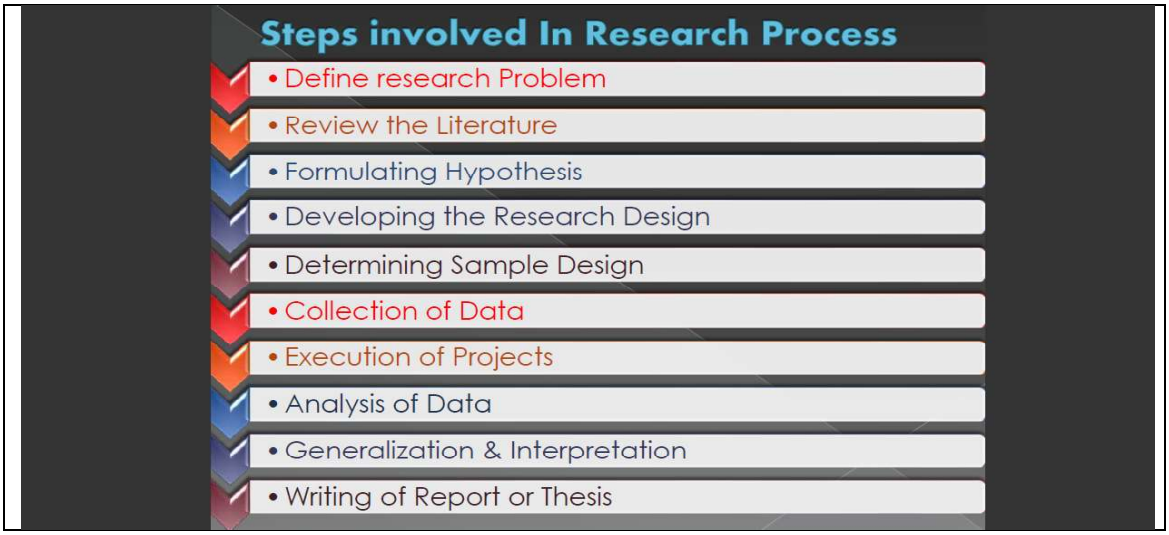
2. ***Interrogative format:***

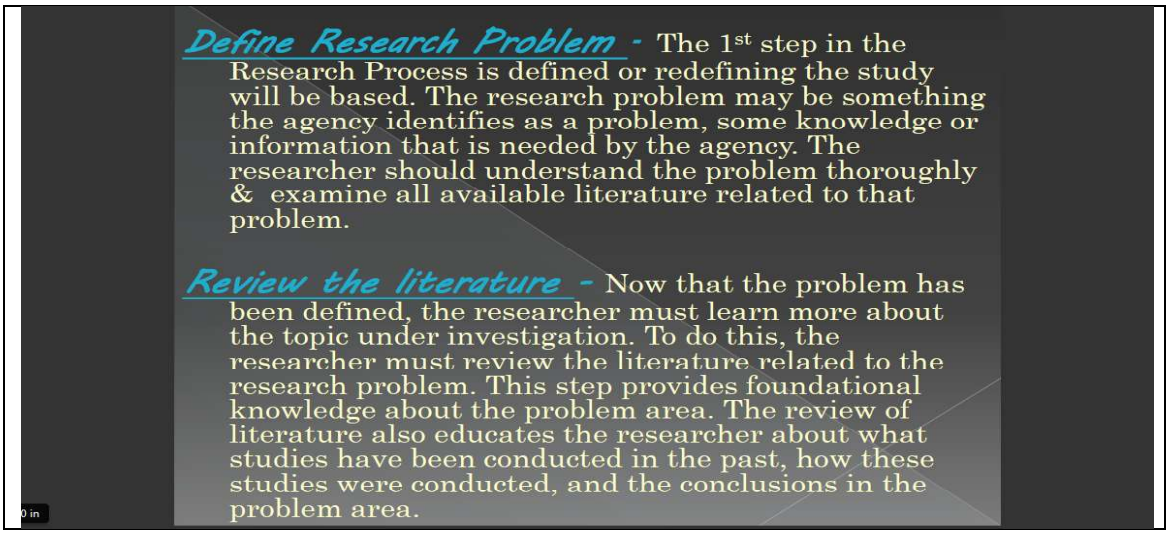
In interrogative format, a research problem is stated in question form.

e.g- "What is the Impact of library internship on MLIS Student of Pondicherry University ?"



RESEARCH PROCESS





Formulating Hypothesis - After Literature survey , researcher should state the working hypothesis in clear terms. Hypothesis should be very specific & limited to the piece of research because is has to be tested. The role of Hypothesis is to guide the researcher & keep him on the right track.

Developing the Research design- The Research Problem having being formulated . The researcher will be required to prepare a research design i.e. he will have to state the structure within which research will be conducted .The function of research design is to provide for the collection of relevant data with minimum expenditure of time, efforts & money.

Determining Sample design - A sample can be defined as a small piece of group. The researcher must decide the way of selecting a sample which is known as SAMPLE DESIGN. Sample can be of various types such as:-

i) Simple/Random Sampling
ii) Systematic Sampling
iii) Quota Sampling

Collection of Data- The actual study begins with the collection of data. The collection of data is a critical step in providing the information needed to answer the research question. Every study includes the collection of some type of data—whether it is from the literature or from subjects—to answer the research question.

Execution of Projects - Execution of projects is very important step as it requires correct lines, adequate & dependable matter.

Analysis of data – After the data has been collected, the researcher has the task of analysing them. The analysis of data requires a number of related operations such as; creating raw data through tabulation pie-charts, coding & then drawing statistical inferences.

Generalization & Interpretation – In this stage, hypothesis is compared by testing various statistical tools such as Chi-square test, F test, T test. Any test may be applied depending upon the nature & object of the research hypothesis. Testing will result in either accepting or rejecting the hypothesis.

Report Writing or Thesis – Finally the research has to prepare the report of what has been done by him, writing of report must be done with great care keeping in view the following points:-

The layout of the report should be in a proper format starting from the introduction which includes Title, Acknowledgement, Introduction, Data Analysis, Finding & Conclusions at the end of the report a list of books, journals, magazines, websites, etc. consulted during research work should be given in the Bibliography.

Causal Research Design

These designs tends to specify the nature of relationship between two or more variables present in the problem environment. This research design attempts to explore cause and affect relationships where causes already exist and cannot be manipulated.

RESEARCH REPORT

Once the researcher has completed data collection, data processing, developing and testing hypotheses, and interpretation of responses, the next important phase in research is the preparation of project/research report. Research report is very essential for the communication of research findings to its potential users.

The purpose of a research report is to communicate the findings and results of a research study or investigation. It serves as a formal document that presents the research process, methodology, analysis, and conclusions to a specific audience, such as researchers, academics, professionals, or decision-makers.

According to Lancaster, "A report is a statement of collected and considered facts, so drawn-up as to give a clear and concise information to persons who are not already in possession of the full facts of the subject matter of the report".

Purpose of Research Report

The objective of a research report is to present the findings of a research study in a structured and comprehensive manner. It serves several important purposes, including:

Communicating Research Findings:

The primary objective of a research report is to communicate the results of a research study to a specific audience, such as researchers, academics, professionals, or policymakers. It provides a detailed account of the research methodology, data analysis, and key findings, ensuring that the information is disseminated to the intended audience.

Providing a Record of the Research:

A research report serves as a documented record of the research process. It includes information about the research design, data collection methods, data analysis techniques, and any challenges or limitations encountered during the study. This record ensures that the research can be replicated, verified, or built upon by other researchers in the future.

Validating research outcomes:

Research reports undergo a peer review process, which involves evaluation by experts in the field. This process ensures the quality and validity of the research outcomes. The objective is to receive constructive feedback, address any concerns or weaknesses, and improve the research study before its publication.

Supporting evidence-based decision-making:

Research reports provide evidence and insights that can inform decision-making processes. Policymakers, professionals, and other stakeholders rely on research findings to

make informed decisions, develop strategies, or implement practices. By presenting the research outcomes in a clear and concise manner, the objective is to facilitate evidence-based decision-making in various fields.

Contributing to the knowledge base:

Research reports contribute to the existing body of knowledge in a particular field. By sharing research findings, methodologies, and insights, they expand the understanding and awareness of a subject or problem. The objective is to add to the collective knowledge and provide a foundation for further research and innovation.

Influencing policy and practice:

Well-conducted and well-documented research reports have the potential to influence policy development, practices, and societal changes. Policymakers and practitioners often rely on research reports to understand the implications of certain actions, evaluate the effectiveness of interventions, or propose new approaches. The objective is to have a real-world impact by influencing policy decisions and improving practices.

Procedure of Research Report

Revising expectation:

Before starting report writing, researcher should revisit the purpose of research and expectation from the researcher. If the researcher is intended to submit academic reports, minimum steps and format are well designed. Hence, researcher should identify the answer of some questions as:

- What is the objective of research?
- Is there any format of reports?
- Is there word limit?
- Who will read the report?
- What is the process of report evaluation? etc.

Answers of such questions help to make a good report.

Preparing outline:

On the basis of nature of data, objective of research, and requirement of the evaluating agency, researcher need to prepare outline i.e. roadmap to the research report. This helps to decide in how many chapters, in how many topics, whether descriptive or analytical report is required to prepare. In simple words, outline helps to arrange the idea before starting write up. It is the planning phase for the content of report for making it more effective. During this

phase, researcher should also plan the time frame within which a report is to be completed and submitted.

Arranging data:

On the basis of objectives, population and sample for the research, researcher collects the data from different sources. Different types of data are collected for the purpose. Such different data from different sources need to be processed and tabulated. Only relevant data are sequentially arranged so that right information will be obtained at the right time for the right purpose. For this different tables of data need to be prepared and named properly.

Preparing the first draft:

The report completed with a single effort may not be excellent. Thus, researcher should update and upgrade the report with series of revisions. For this purpose, the first draft is to be prepared and revisit the whole draft carefully. Add or remove the necessary descriptions, interpretations, and analysis as and when required.

Review and rewrite:

Every report consists of scope of some improvement. It is true that in each reading, you can find something to rewrite or rearrange. This makes the report more interesting and excellent. Thus, researcher must read and reread the draft again and again. During this course of action, you need to compare the report with format (if any specific format is required), methodological conformation, values and data revisit as there may be some misprints, if possible, language expert need to be consulted. After rewriting the drafts, the final draft will be prepared which can be submitted to the concern authority.

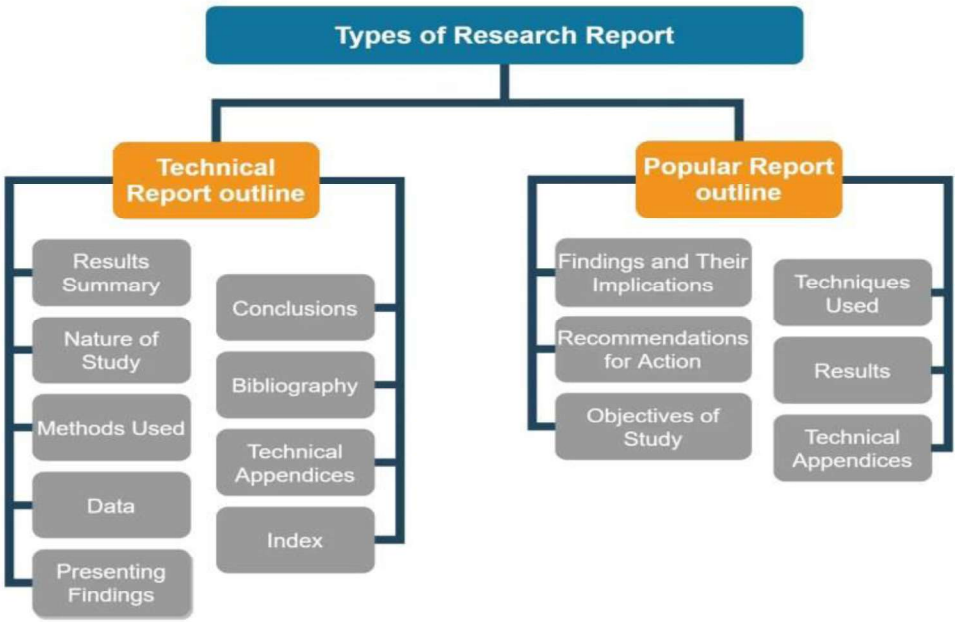
Points to be taken into consideration while writing a Research Report

Research report is a channel of communicating the research findings to the readers of the report. A good research report is one which does this task efficiently and effectively. As such it must be prepared keeping the following precautions in view:

- While determining the length of the report, one should keep in view the fact that it should be long enough to cover the subject but short enough to maintain interest.
- A research report should not be dull; it should be such as to sustain reader's interest.
- Abstract terminology and technical jargon should be avoided in a research report.

- Objective of the study, the nature of the problem, the methods employed and the analysis techniques adopted must all be clearly stated in the beginning of the report in the form of introduction.
- Readers are often interested in acquiring a quick knowledge of the main findings and as such the report must provide a ready availability of the findings. For this purpose, charts, graphs and the statistical tables may be used for the various results in the main report in addition to the summary of important findings.
- The layout of the report should be well thought out and must be appropriate and in accordance with the objective of the research problem.
- The reports should be free from grammatical mistakes and must be prepared strictly in accordance with the techniques of composition of report-writing such as the use of quotations, footnotes, documentation, proper punctuation and use of abbreviations in footnotes and the like.
- A research report should show originality and should necessarily be an attempt to solve some intellectual problem. It must contribute to the solution of a problem and must add to the store of knowledge.
- Appendices should be enlisted in respect of all the technical data in the report.
- Bibliography of sources consulted is a must for a good report and must necessarily be given.

Types of Research Report



Technical Report

Technical report is one that is needed where complete written report of research study is needed for the purpose of public dissemination or record-keeping. In this report, data is presented in a simple manner and key results are defined properly. Technical report emphasis on tools used in study, assumptions made and presentation of findings along with their limitation.

Outline of Technical report is: –

1. **Results Summary-** Description of key findings of the study conducted.
2. **Nature of Study-** Denotes objectives of study, formulating problem on operational basis, hypothesis used for working, type of data needed and kinds of analysis.
3. **Methods Used-** Tools and techniques used for carrying out the study along with their limitations is explained.
4. **Data-** Description of how the data was collected, what are their sources, their characteristics and limitations.
5. **Data Analysis and Presenting Findings-** It is the main body of report where data is analyzed and finding are presented along with supporting data. Distinct types of tables and charts are used for better explanation.
6. **Conclusions-** Findings are narrated in a detailed manner and implications of policies drawn from results is explained.
7. **Bibliography-** It provide details of distinct sources which were consulted while performing a research.
8. **Technical Appendices-** Technical appendices related to mathematical deviations, questionnaire and analysis technique elaboration.
9. **Index-** It is attached invariably at the report end.

Popular Report

Popular report is the one that focuses on attractiveness and simplification of data. It is used when its findings will have policy implications. Focus is laid on writing in a clear manner, minimization of technical aspects, using charts and diagrams in liberal and detailed manner. Other key characteristics of popular report are use of many subheadings, large prints and occasional cartoon. Practical emphasis is given more importance in these type of report.

General outline of Popular Report is as given below: –

1. **Findings and Their Implications-** Focus is given on practical aspects of findings of study conducted and how these findings are implied.
2. **Recommendations for Action-** This section of report on basis of findings provides recommendations for action.
3. **Objectives of Study-** A description of nature of problem and key objectives of conducting a study are explained here.
4. **Techniques Used-** Review of all tools and techniques employed along with data employed for concluding the study is given in this portion of study. All description is given in non-technical manner.
5. **Results-** It is the main portion of report where all finding are denoted in simplified and non-technical terms. All sorts of illustration like diagrams and charts are used liberally.
6. **Technical Appendices-** Technical appendices provides a detailed informed on different methods used, forms etc. In case, if report is meant for general public then technical appendices is kept precise.

(no subject)

1 message

Ravinder Sharma <ravinder.law@tmu.ac.in> Wed, Jun 18, 2025 at 11:25
To: Ravinder Sharma <ravinder.law@tmu.ac.in>

UNIT 2 RESEARCH DESIGN

Research Design
A research design is defined as the overall plan or structure that guides the process of conducting research. It is a critical component of the research process and serves as a blueprint for how a study will be carried out, including the methods and techniques that will be used to collect and analyze data. A well-designed research study is essential for ensuring that the research objectives are met and that the results are valid and reliable.

Key elements of research design include:

Research Objectives: Clearly define the goals and objectives of the research study. What is the research trying to achieve or investigate?
Research Questions or Hypotheses: Formulating specific research questions or hypotheses that address the objectives of the study. These questions guide the research process.
Data Collection Methods: Determining how data will be collected, whether through surveys, experiments, observations, interviews, archival research, or a combination of these methods.
Sampling: Deciding on the target population and selecting a sample that represents that population. Sampling methods can vary, such as random sampling, stratified sampling, or convenience sampling.
Data Collection Instruments: Developing or selecting the tools and instruments needed to collect data, such as questionnaires, surveys, or experimental equipment.
Data Analysis: Defining the statistical or analytical techniques that will be used to analyze the collected data. This may involve qualitative or quantitative methods, depending on the research goals.
Time Frame: Establishing a timeline for the research project, including when data will be collected, analyzed, and reported.
Ethical Considerations: Addressing ethical issues, including obtaining informed consent from participants, ensuring the privacy and confidentiality of data, and adhering to ethical guidelines.
Resources: Identifying the resources needed for the research, including funding, personnel, equipment, and access to data sources.
Data Presentation and Reporting: Planning how the research findings will be presented and reported, whether through written reports, presentations, or other formats.
There are various research designs, such as experimental, observational, survey, case study, and longitudinal designs, each suited to different research questions and objectives. The choice of research design depends on the nature of the research and the goals of the study.

A well-constructed research design is crucial because it helps ensure the validity, reliability, and generalizability of research findings, allowing researchers to draw meaningful conclusions and contribute to the body of knowledge in their field.

10 Types of Research Design
Understanding the intricate tapestry of research design is pivotal for steering your investigations toward unparalleled success. Dive deep into the realm of methodologies, where precision meets impact, and craft tailored approaches to illuminate every research endeavor.

1. Experimental Research Design: Mastering Controlled Trials

Delve into the heart of experimentation with Randomized Controlled Trials (RCTs). By randomizing participants into experimental and control groups, RCTs meticulously assess the efficacy of interventions or treatments, establishing clear cause-and-effect relationships.

2. Quasi-Experimental Research Design: Bridging the Gap Ethically

When randomness isn't feasible, embrace the pragmatic alternative of Non-equivalent Group Designs. These designs allow ethical comparison across multiple groups without random assignment, ensuring robust research conduct.

3. Observational Research Design: Capturing Real-world Dynamics

Capture snapshots of reality with Cross-Sectional Studies, unraveling intricate relationships and disparities between variables in a single moment. Embark on longitudinal journeys with Longitudinal Studies, tracking evolving trends and patterns over time.

4. Descriptive Research Design: Unveiling Insights Through Data

Plunge into the depths of data collection with Survey Research, extracting insights into attitudes, characteristics, and opinions. Engage in profound exploration through Case Studies, dissecting singular phenomena to unveil profound insights.

5. Correlational Research Design: Navigating Interrelationships

Traverse the realm of correlations with Correlational Studies, scrutinizing interrelationships between variables without inferring causality. Uncover insights into the dynamic web of connections shaping research landscapes.

6. Ex Post Facto Research Design: Retroactive Revelations

Explore existing conditions retrospectively with Retrospective Exploration, shedding light on potential causes where variable manipulation isn't feasible. Uncover hidden insights through meticulous retrospective analysis.

7. Exploratory Research Design: Pioneering New Frontiers

Initiate your research odyssey with Pilot Studies, laying the groundwork for comprehensive investigations while refining research procedures. Blaze trails into uncharted territories and unearth groundbreaking discoveries.

8. Cohort Study: Chronicling Evolution

Embark on longitudinal expeditions with Cohort Studies, monitoring cohorts to elucidate the evolution of specific outcomes over time. Witness the unfolding narrative of change and transformation.

9. Action Research: Driving Practical Solutions

Collaboratively navigate challenges with Action Research, fostering improvements in educational or organizational settings. Drive meaningful change through actionable insights derived from collaborative endeavors.

10. Meta-Analysis: Synthesizing Knowledge

Combine perspectives gleaned from various studies through Meta-Analyses, providing a comprehensive panorama of research discoveries.

By honing in on the nuances of each research design and aligning your content with strategic SEO principles, you can ascend to the zenith of search engine rankings and establish your authority in the domain of research methodology.

Top 16 Research Design Methods
Research design methods refer to the systematic approaches and techniques used to plan, structure, and conduct a research study. The choice of research design method depends on the research questions, objectives, and the nature of the study. Here are some key research design methods commonly used in various fields:

1. Experimental Method

Controlled Experiments: In controlled experiments, researchers manipulate one or more independent variables and measure their effects on dependent variables while controlling for confounding factors.

2. Observational Method

Naturalistic Observation: Researchers observe and record behavior in its natural setting without intervening. This method is often used in psychology and anthropology.

Structured Observation: Observations are made using a predetermined set of criteria or a structured observation schedule.

3. Survey Method

Questionnaires: Researchers collect data by administering structured questionnaires to participants. This method is widely used for collecting quantitative research data.

Interviews: In interviews, researchers ask questions directly to participants, allowing for more in-depth responses. Interviews can take on structured, semi-structured, or unstructured formats.

4. Case Study Method

Single-Case Study: Focuses on a single individual or entity, providing an in-depth analysis of that case.

Multiple-Case Study: Involves the examination of multiple cases to identify patterns, commonalities, or differences.

5. Content Analysis

Researchers analyze textual, visual, or audio data to identify patterns, themes, and trends. This method is commonly used in media studies and social sciences.

6. Historical Research

Researchers examine historical documents, records, and artifacts to understand past events, trends, and contexts.

7. Action Research

Researchers work collaboratively with practitioners to address practical problems or implement interventions in real-world settings.

8. Ethnographic Research

Researchers immerse themselves in a particular cultural or social group to gain a deep understanding of their behaviors, beliefs, and practices.

9. Cross-sectional and Longitudinal Surveys

Cross-sectional surveys collect data from a sample of participants at a single point in time.

Longitudinal surveys collect data from the same participants over an extended period, allowing for the study of changes over time.

10. Meta-Analysis

Researchers conduct a quantitative synthesis of data from multiple studies to provide a comprehensive overview of research findings on a particular topic.

11. Mixed-Methods Research

Combines qualitative and quantitative research methods to provide a more holistic understanding of a research problem.

12. Grounded Theory

A qualitative research method that aims to develop theories or explanations grounded in the data collected during the research process.

13. Simulation and Modeling

Researchers use mathematical or computational models to simulate real-world phenomena and explore various scenarios.

14. Survey Experiments

Combines elements of surveys and experiments, allowing researchers to manipulate variables within a survey context.

15. Case-Control Studies and Cohort Studies

These epidemiological research methods are used to study the causes and risk factors associated with diseases and health outcomes.

16. Cross-Sequential Design

Combines elements of cross-sectional and longitudinal research to examine both age-related changes and cohort differences.

The selection of a specific research design method should align with the research objectives, the type of data needed, available resources, ethical considerations, and the overall research approach. Researchers often choose methods that best suit the nature of their study and research questions to ensure that they collect relevant and valid data.

Research designs can vary significantly depending on the research questions and objectives. Here are some examples of research designs across different disciplines:

Experimental Design: A pharmaceutical company conducts a randomized controlled trial (RCT) to test the efficacy of a new drug. Participants are randomly assigned to two groups: one receiving the new drug and the other a placebo. The company measures the health outcomes of both groups over a specific period.
Observational Design: An ecologist observes the behavior of a particular bird species in its natural habitat to understand its feeding patterns, mating rituals, and migration habits.

Survey Design: A market research firm conducts a survey to gather data on consumer preferences for a new product. They distribute a questionnaire to a representative sample of the target population and analyze the responses.
Case Study Design: A psychologist conducts a case study on an individual with a rare psychological disorder to gain insights into the causes, symptoms, and potential treatments of the condition.
Content Analysis: Researchers analyze a large dataset of social media posts to identify trends in public opinion and sentiment during a political election campaign.
Historical Research: A historian examines primary sources such as letters, diaries, and official documents to reconstruct the events and circumstances leading up to a significant historical event.
Action Research: A school teacher collaborates with colleagues to implement a new teaching method in their classrooms and assess its impact on student learning outcomes through continuous reflection and adjustment.
Ethnographic Research: An anthropologist lives with and observes an indigenous community for an extended period to understand their culture, social structures, and daily lives.
Cross-Sectional Survey: A public health agency conducts a cross-sectional survey to assess the prevalence of smoking among different age groups in a specific region during a particular year.
Longitudinal Study: A developmental psychologist follows a group of children from infancy through adolescence to study their cognitive, emotional, and social development over time.
Meta-Analysis: Researchers aggregate and analyze the results of multiple studies on the effectiveness of a specific type of therapy to provide a comprehensive overview of its outcomes.
Mixed-Methods Research: A sociologist combines surveys and in-depth interviews to study the impact of a community development program on residents' quality of life.
Grounded Theory: A sociologist conducts interviews with homeless individuals to develop a theory explaining the factors that contribute to homelessness and the strategies they use to cope.
Simulation and Modeling: Climate scientists use computer models to simulate the effects of various greenhouse gas emission scenarios on global temperatures and sea levels.
Case-Control Study: Epidemiologists investigate a disease outbreak by comparing a group of individuals who contracted the disease (cases) with a group of individuals who did not (controls) to identify potential risk factors.
These examples demonstrate the diversity of research designs used in different fields to address a wide range of research questions and objectives. Researchers select the most appropriate design based on the specific context and goals of their study.

CONCEPT AND SOURCES OF PRIMARY AND SECONDARY DATA

CONTENTS:-

INTRODUCTION

- Various methods of collecting data are employed by social scientists, researcher, investigators, philosopher, and thinkers.
  Here we will discuss the varied dimensions relevant to:
  *Data generation ,
  *Responses and setting for data collection.

- The task of data collection begins after a research problem has been defined and research design /plan chalked out. Researcher would have to decide which sort of data he/she would be using for his study & what method of data collection to be most suitable.

MEANING OF DATA

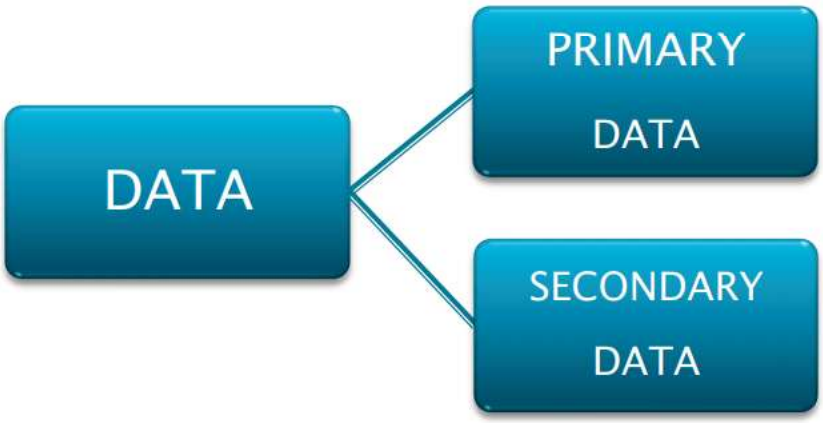
A statistical investigation deals with large mass of inter-related facts in the form of numerical figures. These information in the form of numerical figures is generally termed as data. Whereas sometimes data can be in the form of general description or elaboration too.

or

Data are special type of information, generally obtained through observation, surveys, enquiries, or are generated as a result of human activity for the purpose of research.

TYPES OF DATA

- On the basis of method and sources by which the data is collected the data is classified into two types:-



MEANING OF PRIMARY DATA

- **PRIMARY DATA** : Those data which are collected afresh and for the first time and thus happen to be original in character and known as Primary data. These data are in the shape of raw material.

USES & ADVANTAGES OF PRIMARY DATA

- Original and independent collection increased the authenticity of data.
- Directly Collection enhance the reliability of data.
- Used in both quantitative and qualitative research methods.
- Hidden information can be collected through primary data.
- After analyzed primary data can be used as secondary data.

DISADVANTAGES OF PRIMARY DATA:

- Reliability depend on respondents information accuracy.
- Information can be bias.
- Expensive and time consuming in nature.
- Lack of experience among researcher.
- Requires field work.

MEANING OF SECONDARY DATA:-

- **SECONDARY DATA**: Those data which have been collected by someone else and which have already been passed through the statistical process or analyzed by someone else are known as Secondary data. It is the data which may be published or unpublished, but has been collected and is used for some other purpose earlier.

USES/ADVANTAGES OF SECONDARY DATA:

- These data can be quickly manageable.
- Time and cost balance remains maintained.
- Information available is already analyzed by experts.
- Used to update data or reinterpret existing ones.
- Helpful for philosopher, thinker or authors for developing new concept.
- Field work is less.

DISADVANTAGES OF SECONDARY DATA:

- No standard measurement of validity.
- Need expertise.
- Accuracy and reliability is always lesser than primary data.

DIFFERENCE BETWEEN PRIMARY AND SECONDARY DATA

BASES	PRIMARY DATA	SECONDARY DATA
ORIGINALITY	Primary data are always original as it is collected by the investigator himself.	Secondary data lacks originality. The investigator makes use of the data collected by other agencies.
SUITABILITY	Suitability of the primary data will be positive because it has been systematically collected	Secondary data may or may not suit the objects of enquiry.

CONT...

TIME & MONEY	Primary data are expensive and time consuming.	Secondary data are relatively cheaper and less time consuming for data collection.
EFFORTS	More efforts required for collecting primary data.	Comparatively secondary data collection required less effort.

CONT...

SHAPE	Primary data are in the shape of raw material.	Secondary data are usually in the shape of readymade products.
PERSONAL PREJUDICE	Possibilities of personal prejudice are higher.	There are lesser possibilities of personal prejudice.

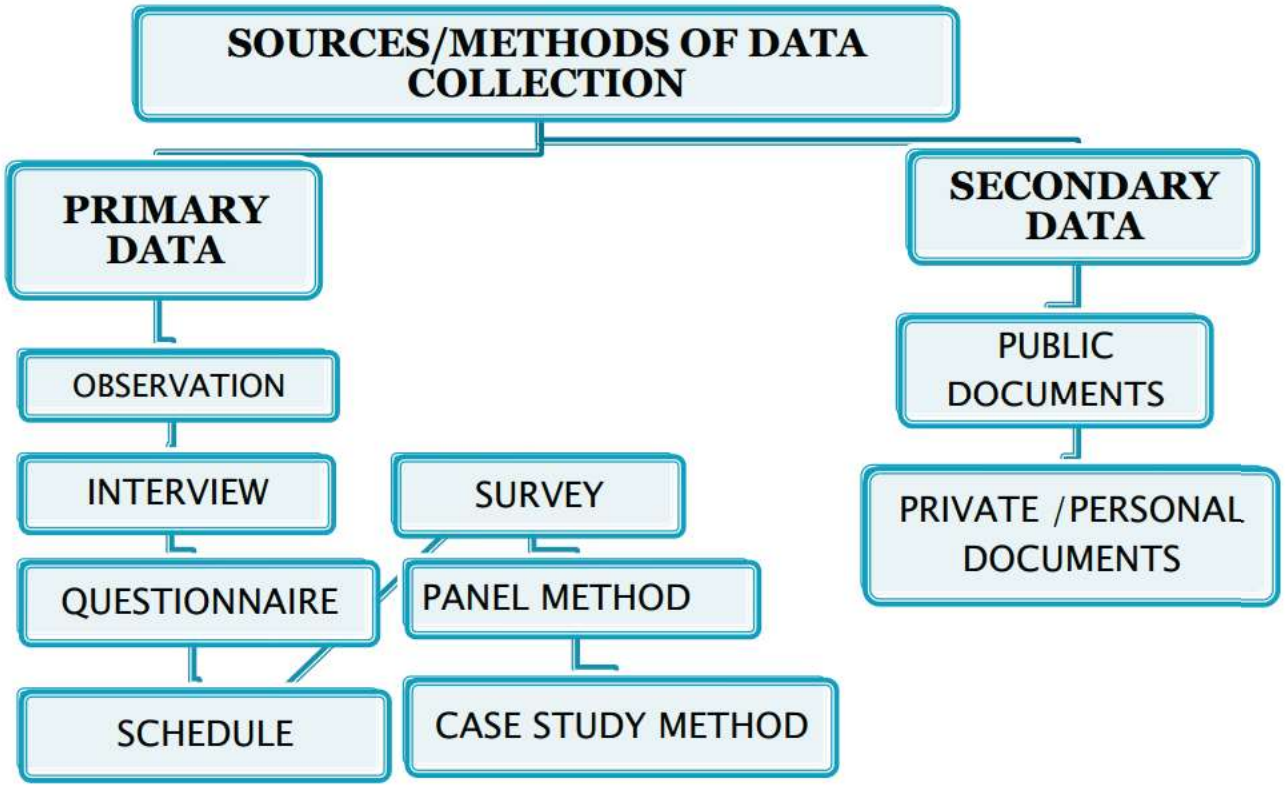
SOURCES/METHODS OF DATA COLLECTION: -

INTRODUCTION

In any research design, method of data collection is considered as the heart of the research. There are various levels or types of sources of collecting data, but here we will discuss only primary and secondary data collection sources. At every type/level several tools and devices are employed. The choice of the particular tool of data collection depends on the attributes of the respondents as well as appropriateness of situation of field studies.

SELECTION OF APPROPRIATE METHOD FOR DATA COLLECTION :

- Field of investigation,
- Nature of data required,
- Objectives and scope of enquiry,
- Budget, & Availability of resources,
- Degree of accuracy desired,
- Time factor


SOURCES/METHODS OF DATA COLLECTION
PRIMARY DATA
SECONDARY DATA
OBSERVATION
INTERVIEW
QUESTIONNAIRE
SCHEDULE
SURVEY
PANEL METHOD
CASE STUDY METHOD
PUBLIC DOCUMENTS
PRIVATE /PERSONAL DOCUMENTS

SOURCES/METHODS OF PRIMARY DATA COLLECTION: -

- **1) OBSERVATION METHOD**: Observation method is a method under which data from the field is collected with the help of observation by the observer or by personally going to the field. No conversation or communication should be done while observing.

- In the words of P.V. Young, "Observation may be defined as systematic viewing, coupled with consideration of seen phenomenon."

TYPES OF OBSERVATION:-

A)-Structured and Unstructured Observation.

B)-Participant and Non Participant Observation.

C)-Controlled and Uncontrolled Observation

ADVANTAGES:

1) – It does not rely on people's willingness to provide information.

2) - Collect data where and when an event or activity is occurring.

3) –This method can be used with interview, survey, and some other data collection method.

4) - No need of question preparation.

5)- it is suitable to studies those respondents who are not capable of giving verbal response.

DISADVANTAGES:

1) - Hawthorne effect – people usually perform better when they know they are being observed.
2)-It is a time consuming method.
3)-Limited information.
4)- Lack of verbal communication causes barriers.
5)- Depends on observer own qualities.
6)- This method is suitable for smaller setting.

2) INTERVIEW METHOD: This method of collecting data involves presentation or oral-verbal stimuli and reply in terms of oral-verbal responses. Conversation and communication is the main tool of interview.

Types of Interviews:

A) Personal interviews
B) Telephonic interviews
C) Structured interviews
D) Unstructured interviews
E) Focused interviews
F) In-Depth interviews

TYPES OF INTERVIEWS:

These are as follows:

A) Personal interviews: The interviewer asks questions generally in a face to face contact to the other person or persons.

B) Telephonic interviews: When it is not possible to contact the respondent directly, then interview is conducted through –Telephone.

C) Structured interviews: In this case, a set of pre-decided questions are there.

D) Unstructured interviews: In this case, we don't follow a system of pre-determined questions.

CONT..

E) Focused interviews: It has structure and deals with major of interests which gives respondent freedom to answer a battery of questions. It involves respondent regarding particular experience.

F) IN-Depth interviews: The researcher tries to work out on the fact which reveals respondents motivations, unsatisfied desires & other crucial factors that are to be found out of his attitude & behavior. Special devices used like, rapid fire questioning.

ADVANTAGES:

1)-Interviewer can collect supplementary information about respondent's personal characteristics and environment which has value in interpreting results.

2)-Non Responses are generally low.

3)-Samples can be controlled more effectively.

4)-Allows respondents to describe what is important to them.

5)-There is greater flexibility; due to restructuring questions can be done.

DISADVANTAGES:

1)-Respondent may give bias information.

2)-Expensive method.

3)-Some Executive people are not approachable so data collected may be inadequate.

4)-Takes more time when samples are more, Systematic errors may be occurred.

3) QUESTIONNAIRE METHOD: This is a set of questions arranged logically, divided into groups, with the object of collecting information for research. The questionnaire is mailed to respondents who are expected to read and understand the questions and write down the reply in the space meant for the purpose in the questionnaire itself or either chooses the reply among all choices available on closed end questionnaire.

VARIOUS FORMS OF QUESTIONS USED IN QUESTIONNAIRE:

A) Direct Question and Indirect Question
B) Open Form of Questions and Closed -end Form of Questions
C) Dual-choice Questions or Multiple Choice Questions (MCQ), and Scale or Rating Questions .

ADVANTAGES:-

1) - Low cost even the geographical area is large to cover.

2) - Answers are in respondent's own words so free from bias.

3)-Adequate time to think for answers.

4)-Non approachable respondents may be conveniently contacted.

5)-Large samples can be used so results are more reliable.

DISADVANTAGES:

1)-Time consuming and expensive compared to other data collection methods.

2)-It is very expensive method.

3) -Low rate of return of duly filled questionnaire.

4) - It can be used when respondent is educated and co -operative.

5)-Difficult to know the expected respondent have filled the form or it is filled by some one else.

4) SCHEDULE METHOD: It is one of the important methods for the study of social problems. Schedules is like a questionnaires but it filled by enumerator. Enumerators are specially appointed for filling the questionnaire, they explains the aim and objective to respondent and fill the answers in provided space.

In the words of Thomas Carson McCormick, "The schedule is nothing more than a list of questions which it seems necessary to test the hypothesis."

ADVANTAGES:

1) - In Schedule the information is collected complete and accurate.

2)-Direct personal contact is established with respondents and useful in extensive enquiries.

3) - Information can collect from illiterates also.

4) – Population census all over the world is conducted through this method.

5) - Non response is low.

DISADVANTAGES:

1)-Depends on Honesty and competence of enumerator.

2)-It's an very expensive and time consuming method.

3)-This method requires field work.

4)-Not very useful for small organization or small budget research purpose.

5) SURVEY METHOD: One of the common methods of diagnosing and solving of social problems are that of undertaking surveys.

Surveys are….

1. A detailed inspection or investigation.

2. A general or comprehensive view.

3. A gathering of a sample of data or opinions considered to be representative of a whole.

In the words of Festinger and Kat, "Many research problems require systematic collection of data from population through the use of personal interviews or other data gathering devices.

TYPES OF SURVEY:-

- General or Specific survey
- Census or sample survey
- Public opinion surveys
- Private surveys
- Confidential survey
- Postal survey
- Pilot or main survey

ADVANTAGES:

- Valid and reliable conclusion.
- Helpful in the progress of science.
- Study of social changes and problems.
- Some people feel more comfortable responding to a survey than participating in an interview.

DISADVANTAGES:

♣Good surveys are time consuming.

♣ Given lack of contact with respondent, never know who really completed the survey.

♣ Size and diversity of sample will be limited by people's ability to read.

♣ Survey respondents may not complete the survey resulting in low response rates.

6) PANEL METHOD: In this method, data is collected from the same sample respondents at the some interval either by mail or by personal interview.

This is used for studies on:

1) Expenditure Pattern
2) Consumer Behavior
3) Effectiveness of Advertising
4) Voting Behavior and so on

ADVANTAGES: -

1)-Best method for marketing research.

2) -Helpful in discovering latest changes on trends.

3) -This method is useful before the introduction of any product and after that too.

4)- Helpful in determining taste and preference of consumer.

DISADVANTAGES:-

1) – Time consuming.

2) – Useful in long and detailed research only.

3)– Expensive method.

4)– Depends on respondents honesty and knowledge.

7) CASE STUDY METHOD: It is an appropriate tool of data collection in studying a individual a family a institution or group behavior in detail. It is essentially an intensive investigation of the particular unit under consideration.

Its important characteristics are as follows:

a) The researcher can take one single social unit or more of such units for his study purpose.

b) The selected unit is studied intensively i.e. it is studied in minute details.

c)- The behavior pattern of the concerning unit is studied.

ADVANTAGES:

1) - It is helpful in theory building & testing.
2) - It is widely used in the studies of psychology, industry, & for anthropological research.
3) - Fully depicts people's experience in program input, process, and results.
4)- It helps in formulating relevant hypotheses along with the data which may be helpful in testing them.
5)- Helps to construct appropriate questionnaire or schedule.

DISADVANTAGES:

1)-From a methodological view point it is improbable to classify data into a uniform order.

2)-Case data is hardly comparable with statistical quantitative data.

3) - Classification & generalization is never being done.

4)- Its based on several assumptions which may not be very realistic.

5)- It can use in a limited sphere, not for big society case, sampling is also not possible.

METHODS/SOURCES OF SECONDARY DATA COLLECTION:-

Secondary data are available mainly in two forms- published data and unpublished data:-

PUBLISHED DATA: Published data are more often the information required by individuals and organizations is published in some form or the other in consideration of user's need. It can used in annexure too.

For e.g. the companies publish there financial statements in the form of quarterly or half yearly or annual reports.

UNPUBLISHED DATA: - Unpublished data are that secondary information which is available from records which are not published due to privacy or variety of reasons.

For e.g. works of scholars, research workers, trade associations etc.

Secondary sources can be divided into two kinds:-

1)-PERSONAL/PRIVATE RECORDS OR DOCUMENTS- This documents denotes individual's feelings, opinions and an idea about different socio-cultural changes, social incidents and structural changes. These records can be in both published and unpublished form.

A)-Letters,

B)-Personal diaries,

C)-Autobiography and memories.

D)-Enquiries or investigation of private nature for use of their members only.

Cont..

2)-PUBLIC DOCUMENTS OR RECORDS- Public documents play a vital role in secondary source of data collection. Various types of unpublished and published data are collected by government on non government agencies.

These public documents/records are…..

A)-Publications of Central, state, local government.

B)-Technical and trade journals.

C)-Books, Magazines, Newspaper …..

D)-Reports & publications of industry, bank, stock exchange.

E)-Reports by research scholars, Universities, economists.

F)-Association or census reports, reports of international org. (UNESCO, WHO, ILO etc).

G)-Official records.

H)-Historical records.

CONCLUSION

- On the basis of above it can be concluded that non of the methods is free from one or the other drawback. In fact, the method to be chosen depends upon the nature of investigation, object and scope of enquiry, budget made for the purpose of data collection, degree of accuracy desired and time with in which the data has to be collected.

THANK YOU

(no subject)

1 message

Ravinder Sharma <ravinder.law@tmu.ac.in> Sat, May 24, 2025 at 19:19
To: Ravinder Sharma <ravinder.law@tmu.ac.in>

DATA ANALYSIS IN RESEARCH : Types & Methods

Data-analysis-in-research

Content Index

What is data analysis in research?

Definition of research in data analysis: According to LeCompte and Schensul, research data analysis is a process used by researchers to reduce data to a story and interpret it to derive insights. The data analysis process helps reduce a large chunk of data into smaller fragments, which makes sense.

Three essential things occur during the data analysis process — the first is data organization. Summarization and categorization together contribute to becoming the second known method used for data reduction. It helps find patterns and themes in the data for easy identification and linking. The third and last way is data analysis – researchers do it in both top-down and bottom-up fashion.

On the other hand, Marshall and Rossman describe data analysis as a messy, ambiguous, and time-consuming but creative and fascinating process through which a mass of collected data is brought to order, structure and meaning.

We can say that “the data analysis and data interpretation is a process representing the application of deductive and inductive logic to the research and data analysis.”

Why analyze data in research?

Researchers rely heavily on data as they have a story to tell or research problems to solve. It starts with a question, and data is nothing but an answer to that question. But, what if there is no question to ask? Well! It is possible to explore data even without a problem – we call it ‘Data Mining’, which often reveals some interesting patterns within the data that are worth exploring.

Irrelevant to the type of data researchers explore, their mission and audiences’ vision guide them to find the patterns to shape the story they want to tell. One of the essential things expected from researchers while analyzing data is to stay open and remain unbiased toward unexpected patterns, expressions, and results. Remember, sometimes, data analysis tells the most unforeseen yet exciting stories that were not expected when initiating data analysis. Therefore, rely on the data you have at hand and enjoy the journey of exploratory research.

Types of data in research

Every kind of data has a rare quality of describing things after assigning a specific value to it. For analysis, you need to organize these values, processed and presented in a given context, to make it useful. Data can be in different forms; here are the primary data types.

Qualitative data: When the data presented has words and descriptions, then we call it qualitative data. Although you can observe this data, it is subjective and harder to analyze data in research, especially for comparison. Example: Quality data represents everything describing taste, experience, texture, or an opinion that is considered quality data. This type of data is usually collected through focus groups, personal qualitative interviews, qualitative observation or using open-ended questions in surveys.

Quantitative data: Any data expressed in numbers of numerical figures are called quantitative data. This type of data can be distinguished into categories, grouped, measured, calculated, or ranked. Example: questions such as age, rank, cost, length, weight, scores, etc. everything comes under this type of data. You can present such data in graphical format, charts, or apply statistical analysis methods to this data. The (Outcomes Measurement Systems) OMS questionnaires in surveys are a significant source of collecting numeric data.

Categorical data: It is data presented in groups. However, an item included in the categorical data cannot belong to more than one group. Example: A person responding to a survey by telling his living style, marital status, smoking habit, or drinking habit comes under the categorical data. A chi-square test is a standard method used to analyze this data.

Data analysis in qualitative research

Data analysis and qualitative data research work a little differently from the numerical data as the quality data is made up of words, descriptions, images, objects, and sometimes symbols. Getting insight from such complicated information is a complicated process. Hence it is typically used for exploratory research and data analysis.

Finding patterns in the qualitative data
Although there are several ways to find patterns in the textual information, a word-based method is the most relied and widely used global technique for research and data analysis. Notably, the data analysis process in qualitative research is manual. Here the researchers usually read the available data and find repetitive or commonly used words.

For example, while studying data collected from African countries to understand the most pressing issues people face, researchers might find "food" and "hunger" are the most commonly used words and will highlight them for further analysis.

The keyword context is another widely used word-based technique. In this method, the researcher tries to understand the concept by analyzing the context in which the participants use a particular keyword.

For example, researchers conducting research and data analysis for studying the concept of 'diabetes' amongst respondents might analyze the context of when and how the respondent has used or referred to the word 'diabetes.'

The scrutiny-based technique is also one of the highly recommended text analysis methods used to identify a quality data pattern. Compare and contrast is the widely used method under this technique to differentiate how a specific text is similar or different from each other.

For example: To find out the "importance of resident doctor in a company," the collected data is divided into people who think it is necessary to hire a resident doctor and those who think it is unnecessary. Compare and contrast is the best method that can be used to analyze the polls having single-answer questions types.

Metaphors can be used to reduce the data pile and find patterns in it so that it becomes easier to connect data with theory.

Variable Partitioning is another technique used to split variables so that researchers can find more coherent descriptions and explanations from the enormous data.

Methods used for data analysis in qualitative research

There are several techniques to analyze the data in qualitative research, but here are some commonly used methods,

Content Analysis: It is widely accepted and the most frequently employed technique for data analysis in research methodology. It can be used to analyze the documented information from text, images, and sometimes from the physical items. It depends on the research questions to predict when and where to use this method.

Narrative Analysis: This method is used to analyze content gathered from various sources such as personal interviews, field observation, and surveys. The majority of times, stories, or opinions shared by people are focused on finding answers to the research questions.
Discourse Analysis: Similar to narrative analysis, discourse analysis is used to analyze the interactions with people. Nevertheless, this particular method considers the social context under which or within which the communication between the researcher and respondent takes place. In addition to that, discourse analysis also focuses on the lifestyle and day-to-day environment while deriving any conclusion.

Grounded Theory: When you want to explain why a particular phenomenon happened, then using grounded theory for analyzing quality data is the best resort. Grounded theory is applied to study data about the host of similar cases occurring in different settings. When researchers are using this method, they might alter explanations or produce new ones until they arrive at some conclusion.

Choosing the right software can be tough. Whether you're a researcher, business leader, or marketer, check out the top 10 qualitative data analysis software for analyzing qualitative data.

Data analysis in quantitative research
Preparing data for analysis

The first stage in research and data analysis is to make it for the analysis so that the nominal data can be converted into something meaningful. Data preparation consists of the below phases.

Phase I: Data Validation
Data validation is done to understand if the collected data sample is per the pre-set standards, or it is a biased data sample again divided into four different stages

Fraud: To ensure an actual human being records each response to the survey or the questionnaire
Screening: To make sure each participant or respondent is selected or chosen in compliance with the research criteria

Procedure: To ensure ethical standards were maintained while collecting the data sample

Completeness: To ensure that the respondent has answered all the questions in an online survey. Else, the interviewer had asked all the questions devised in the questionnaire.

Phase II: Data Editing
More often, an extensive research data sample comes loaded with errors. Respondents sometimes fill in some fields incorrectly or sometimes skip them accidentally. Data editing is a process wherein the researchers have to confirm that the provided data is free of such errors. They need to conduct necessary checks and outlier checks to edit the raw edit and make it ready for analysis.

Phase III: Data Coding

Out of all three, this is the most critical phase of data preparation associated with grouping and assigning values to the survey responses. If a survey is completed with a 1000 sample size, the researcher will create an age bracket to distinguish the respondents based on their age. Thus, it becomes easier to analyze small data buckets rather than deal with the massive data pile.

Methods used for data analysis in quantitative research

After the data is prepared for analysis, researchers are open to using different research and data analysis methods to derive meaningful insights. For sure, statistical analysis plans are the most favored to analyze numerical data. In statistical analysis, distinguishing between categorical data and numerical data is essential, as categorical data involves distinct categories or labels, while numerical data consists of measurable quantities. The method is again classified into two groups. First, 'Descriptive Statistics' used to describe data. Second, 'Inferential statistics' that helps in comparing the data.

Descriptive statistics

This method is used to describe the basic features of versatile types of data in research. It presents the data in such a meaningful way that pattern in the data starts making sense. Nevertheless, the descriptive analysis does not go beyond making conclusions. The conclusions are again based on the hypothesis researchers have formulated so far. Here are a few major types of descriptive analysis methods.

Measures of Frequency
Count, Percent, Frequency
It is used to denote home often a particular event occurs.
Researchers use it when they want to showcase how often a response is given.
Measures of Central Tendency
Mean, Median, Mode
The method is widely used to demonstrate distribution by various points.
Researchers use this method when they want to showcase the most commonly or averagely indicated response.
Measures of Dispersion or Variation
Range, Variance, Standard deviation
Here the field equals high/low points.
Variance standard deviation = difference between the observed score and mean
It is used to identify the spread of scores by stating intervals.
Researchers use this method to showcase data spread out. It helps them identify the depth until which the data is spread out that it directly affects the mean.
Measures of Position
Percentile ranks, Quartile ranks
It relies on standardized scores helping researchers to identify the relationship between different scores.
It is often used when researchers want to compare scores with the average count.

For quantitative research use of descriptive analysis often give absolute numbers, but the in-depth analysis is never sufficient to demonstrate the rationale behind those numbers. Nevertheless, it is necessary to think of the best method for research and data analysis suiting your survey

questionnaire and what story researchers want to tell. For example, the mean is the best way to demonstrate the students' average scores in schools. It is better to rely on the descriptive statistics when the researchers intend to keep the research or outcome limited to the provided sample without generalizing it. For example, when you want to compare average voting done in two different cities, differential statistics are enough.

Descriptive analysis is also called a 'univariate analysis' since it is commonly used to analyze a single variable.

Inferential statistics

Inferential statistics are used to make predictions about a larger population after research and data analysis of the representing population's collected sample. For example, you can ask some odd 100 audiences at a movie theater if they like the movie they are watching. Researchers then use inferential statistics on the collected sample to reason that about 80-90% of people like the movie.

Here are two significant areas of inferential statistics.

Estimating parameters: It takes statistics from the sample research data and demonstrates something about the population parameter.

Hypothesis test: It's about sampling research data to answer the survey research questions. For example, researchers might be interested to understand if the new shade of lipstick recently launched is good or not, or if the multivitamin capsules help children to perform better at games.

These are sophisticated analysis methods used to showcase the relationship between different variables instead of describing a single variable. It is often used when researchers want something beyond absolute numbers to understand the relationship between variables.

Here are some of the commonly used methods for data analysis in research.

Correlation: When researchers are not conducting experimental research or quasi-experimental research wherein the researchers are interested to understand the relationship between two or more variables, they opt for correlational research methods.

Cross-tabulation: Also called contingency tables, cross-tabulation is used to analyze the relationship between multiple variables. Suppose provided data has age and gender categories presented in rows and columns. A two-dimensional cross-tabulation helps for seamless data analysis and research by showing the number of males and females in each age category.

Regression analysis: For understanding the strong relationship between two variables, researchers do not look beyond the primary and commonly used regression analysis method, which is also a type of predictive analysis used. In this method, you have an essential factor called the dependent variable. You also have multiple independent variables in regression analysis. You undertake efforts to find out the impact of independent variables on the dependent variable. The values of both independent and dependent variables are assumed as being ascertained in an error-free random manner.

Frequency tables: The statistical procedure is used for testing the degree to which two or more vary or differ in an experiment. A considerable degree of variation means research findings were significant. In many contexts, ANOVA testing and variance analysis are similar.

Analysis of variance: The statistical procedure is used for testing the degree to which two or more vary or differ in an experiment. A considerable degree of variation means research findings were significant. In many contexts, ANOVA testing and variance analysis are similar.

Considerations in research data analysis

Researchers must have the necessary research skills to analyze and manipulation the data, Getting trained to demonstrate a high standard of research practice. Ideally, researchers must possess more than a basic understanding of the rationale of selecting one statistical method over the other to obtain better data insights.

Usually, research and data analytics projects differ by scientific discipline; therefore, getting statistical advice at the beginning of analysis helps design a survey questionnaire, select data collection methods, and choose samples

The primary aim of data research and analysis is to derive ultimate insights that are unbiased. Any mistake in or keeping a biased mind to collect data, selecting an analysis method, or choosing audience sample il to draw a biased inference.

Irrelevant to the sophistication used in research data and analysis is enough to rectify the poorly defined objective outcome measurements. It does not matter if the design is at fault or intentions are not clear, but lack of clarity might mislead readers, so avoid the practice.

The motive behind data analysis in research is to present accurate and reliable data. As far as possible, avoid statistical errors, and find a way to deal with everyday challenges like outliers, missing data, data altering, data mining, or developing graphical representation.

LEARN MORE: Descriptive Research vs Correlational Research

The sheer amount of data generated daily is frightening. Especially when data analysis has taken center stage. in 2018. In last year, the total data supply amounted to 2.8 trillion gigabytes. Hence, it is clear that the enterprises willing to survive in the hypercompetitive world must possess an excellent capability to analyze complex research data, derive actionable insights, and adapt to the new market needs.

QuestionPro is an online survey platform that empowers organizations in data analysis and research and provides them a medium to collect data by creating appealing surveys.

(no subject)

1 message

Ravinder Sharma <ravinder.law@tmu.ac.in> Sat, May 24, 2025 at 19:12
To: Ravinder Sharma <ravinder.law@tmu.ac.in>

PREPARING A RESEARCH REPORT.

The research report is considered as a major component of the research work, because through this report the research problem, the research design, the analysis and findings are brought to the knowledge of the world. The research report converts the research work into a public asset from its earlier state of private asset.

The research report shows the readers the progress in knowledge made in the specific area or discipline. The report by bringing to light the new frontiers of knowledge enhances the society's intellectual well-being. The report by highlighting the design and methodology, runs as a fore-runner for future researchers in this or related area. The analyses and interpretations may give a boost to knowledge. The findings and suggestions take the readers into enlightenment from ignorance. Every research must endeavor to achieve this. Research report is a record of the whole of every bit of the research work. This document is a reservoir of knowledge for current and future references and use to solve societal problems. Research report is the means through which communication of the entire work to the society is made. For other researchers, a documented research is a source of information and that a research report generates more research interests. Research report propagates knowledge throughout the humanity or the globe.
The role of a research report is best known in the absence of the same – Assume for a while, that no researcher gives out his research work in the form of a report. Then the research work is just like a lamp in the pot. When, it takes the form of report it is like a lamp on the hillock illuminating the surroundings. If a research report is not made, even the researcher may not be able tell his work at a future date. Thanks to human's potentials to forget. Such waste of efforts should never occur. If only a research report was made out, re-inventing the wheel would not take place otherwise, same problem may be analyzed by different people at different places or in the same place at different times or at the same time. This is a greater waste of human energy. Thus a research report conserves energy that would otherwise would have been spent uselessly.
Contents of Research Report

A research report generally contains three aspects:
1.Preliminary Section,
2.Main Body and
3.Reference Section.
These are briefly given below:
1. Preliminary Section
The preliminary section deals with title, acknowledgement, etc.

1.Title Page: The title of the research report usually bears the investigator's name, a statement as to the course for which the study has been required, the date of submission, and the name of the institution making that requirement. In reports of studies not undertaken for any course, the investigator's name, the institution he belongs to and the date of completion of the work is indicated. In a published thesis the latter information is substituted or supplemented by the name of the publishers and the date and place of publication.

2.Acknowledgement Page : The acknowledgement page is largely one of courtesy in which the investigator acknowledges the guidance and assistance he has received in the development of the study. Acknowledgement may not refer to the guide so much as to others who may have aided in a special way. It is rightly said that good taste calls for acknowledgements to be expressed simply and tactfully.

3.Preface or Foreword : Sometimes a preface or foreword of one or two pages long, follows the acknowledgement page, bearing some initial remarks and perhaps a brief statement of the scope, aim and general character of the research.
4.Table of Contents : A well-developed table of contents renders a good deal of assistance to a reader in choosing rapidly and judiciously what he should, subsequently, read carefully. It is usually desirable to include in it not only the chapter headings, but also the headings of the major subdivisions of the chapters. Sometimes the topics within the subdivisions are also included and are found enlightening by the readers.

5.Lists of Tables and Figures : Another device used to supplement the table of contents for throwing more light on the subject of the thesis is that of giving lists of tables and figures which occur in the report.

2. Main Body of the Report
The main body of the research report contains all the material aspect of the research work.

1.Introduction : The first part of the main body of the report, the Introduction, usually includes a statement of the factors leading up to the choice of the problem, the purposes of the study, the value and significance attached to the problem by the investigator as a contribution to knowledge and any other information to express the sincerity of the investigator in his selection. A statement and

elucidation of the problem sometimes forms a part of the introduction; but more often/it is set up as a separate unit. If this is stated in a clear-cut and logical manner, the reader is able to get a sufficiently clear insight into the study from the very beginning. The problem should be defined in detail. The exact area the investigation is supposed to cover must be well demarcated. The sources of information selected and their nature and delimitation's should be mentioned and justified. All terms of a technical nature or those which may seem vague to the lay reader need to be defined carefully. The objectives, limitations, hypotheses, etc. are given. The methodology and design of the study are also given in introduction. To explain the developmental process used for the sturdy the investigator has to describe the techniques and tools he has used for collecting, organizing, analyzing and interpreting his data. The sources of data tapped, the channels prepared or adapted and utilized, the nature of data collected, their validity and reliability – all these should be given in a clear and adequate manner. Data collected, but rejected and the methods tried but not pursued – these should also find their place in the report and should not be just left out of the picture.

2.Survey of Related Literature : Any research worker has to be up-to-date in his information about studies, related to his own problem, already made by others. References are made to such similar or related studies and their evaluation too is made for the benefit of the reader either in the Introductory chapter, or else in a separate chapter. Herein the author finds another opportunity to justify his own endeavor and to emphasize the worthwhile elements in the treatment, selected by him, of the problem. Read More: The Literature Review in Research

3.Analysis and Interpretation ;The analysis and interpretation section deals with the main works undertaken. Each objective of the research work, each hypothesis, each research question posed and such other major constituents of the research work are thoroughly probed, analysed using the statistical data collected applying appropriate tools of analysis and interpretations are made in the light of the analysis made. Unusual or complex techniques of collection, organization, analysis and interpretation are explained in full. Whether the original data themselves should be included in the text or given in the appendix depends on the nature of the data. If they are not too extensive and are necessary to clarify the discussion, they should certainly find a place in the text proper, or in the footnotes. If they are extensive and cumbersome, they should be placed in the appendix. Of the various aids used to make the presentation of data more effective, tables and figures are most common. When statistical data are assembled according to certain common factors in the form of tables, significant relationships show up clearly. Depending on the type of material at one's disposal, many kinds of figures are found useful, e.g., statistical diagrams, photographs and maps, etc. All the information described above is sometimes confined to one chapter with separate subdivisions arranged stage-wise. Otherwise, separate chapters are devoted each major functional area or objective studied. The arrangement depends on the quantity of information one has to convey to the reader regarding the different stages in the process of the development of the study.

4.Conclusion : The final unit of the report usually contains the findings of the study, the conclusions the investigator has arrived at, and the generalization he has formulated on the basis of the study. In stating the conclusions, the investigator must indicate what his contribution has been to his field of study. He should indicate on what data his various conclusions are based. He should clearly demarcate between the inevitable conclusions and his own interpretation of certain data. The range of applicability of the conclusions should be indicated on the basis of the limitations of the sources, the sample, the tools of collection and analysis, etc. Negative as well as positive results should find a place in the conclusions. Any recommendations, as to the application of the findings, the investigator wishes to make, can find a place in this chapter. Recommendations or suggestions for further study in the field touched by the present research are also found useful and are usually included in the concluding chapter.

3. Referencing Section of the Report

Referencing section of any research report has three elements namely, bibliography, appendix and index.

BIBLIOGRAPHY AND ITS USE.

1.Bibliography : The 'works cited' form of bibliography is preferable over the 'sources consulted'. Every book, thesis, article, documents which has been cited should be included in the list of 'works cited'. The bibliography should follow a logical arrangement in alphabetical order. In report of current practice is to have one comprehensive listing-not to divide into books, journals, newspapers, official papers, documents and manuscripts. The author(s) name, the title of the work, date of publication, name of the publisher and the place of publication be mentioned. For articles, the volume number and inclusive pages be also given, the author's initials or surname should follow the name. When there are three or more authors of a particular work, the co-authors may be referred alphabetically If there by more than one work by the same author, the author's name should be listed only once; subsequently a line will substitute his name. This bibliographical listing should not be numbered. It should be given only at the end of the thesis,

2.Appendix : The appendix section gives a copy of the tools of research used, certain sample statistical workings, articles published by the researcher, etc. Each class of material given may be numbered as Appendix I, Appendix II and so on. It is saner to give the appendices in the same order in which the relevant items are used.

3.Index : Index is a very important component which facilitates easy location of a concept or entity mentioned in the main body of the work. Here alphabetical order is followed. Page number is given to easy location. Author Index, Subject Index and Sponsor Index are certain indices used. All the three may be separately given and merged into one single class of 'index'.

Principles of Good Research Report Writing

Following are some important principles for writing a good research report:

Make small sentences:Reading begins to get strenuous when sentences used in the research report average more than 25 words.

1. Vary sentence length: In using short sentences do not let the work become choppy. Sentences of considerable length are all right provided. Better they are balanced with enough short sentences.

2. Use simple words: The researcher is advised to use simple words in his research report.

3. Use familiar words: It is better to use familiar words in a research report.

4. Avoid unnecessary words: The use of unnecessary words tire a reader and fog up the writing.

5. Write to express not to impress: The best way to impress the reader of report is to express what you have to say clearly and directly.

6. Write as you talk: The researcher should make his report writing as though it is his speech.
7. Keep as many active verbs as possible: Use of active verbs puts life into report writing.

8. Tie in with reader's experience: Always write research reports with a particular reader in mind. Relate what you have to tell him about your research report. This is the way to have the reader understand your report.

9. Make the report short and sweet: A short report makes reading interest and sweet. Short report should not mean short-cut report.

(no subject)

1 message

Ravinder Sharma <ravinder.law@tmu.ac.in> Sat, May 24, 2025 at 20:05
To: Ravinder Sharma <ravinder.law@tmu.ac.in>

What is Bibliography?: Meaning, Types, and Importance.

A bibliography is an organized list of all the sources consulted, referenced, or cited in the creation of a written work, such as an academic paper, essay, book, or research article. It typically appears at the end of the document and serves as a comprehensive record of the materials that inform the content and arguments presented. A bibliography may include many sources, such as books, journal articles, websites, conference papers, and multimedia resources.

The primary purpose of a bibliography is to provide proper credit to the authors and creators of the works used, ensuring ethical and transparent research practices. It also allows readers to locate and verify the sources for further exploration or to cross-check the authenticity and reliability of the work.

Bibliographies can take different forms, depending on their intended purpose and the citation style used. Common citation styles like APA, MLA, and Chicago dictate the format and structure of bibliographic entries. In some cases, annotated bibliographies are used to provide brief descriptions or evaluations of each source. Including a well-organized bibliography demonstrates academic integrity, aids in knowledge sharing, and enhances the credibility of the written work by showing the depth and breadth of the research conducted.

What is a Bibliography?
A bibliography is an organized list of the sources used or consulted during the research and writing of a work, such as a book, essay, research paper, or report. Typically found at the end of a document, a bibliography serves to credit the authors and creators of the materials that informed the writer's ideas, arguments, or conclusions. It is an essential component of academic and professional writing, ensuring ethical research practices and helping to avoid plagiarism by providing proper attribution. A bibliography not only enhances the credibility of the work but also acts as a resource for readers, enabling them to locate and explore the cited materials for further study.

The structure of a bibliography can vary depending on the purpose and the citation style being followed, such as APA, MLA, or Chicago. Generally, it includes information like the author's name, title of the work, publication date, publisher, and, for digital sources, the URL or DOI. Some bibliographies are annotated, including brief descriptions or evaluations of the listed sources to provide additional context or critique. By systematically organizing and documenting sources, a bibliography reflects the breadth and depth of research undertaken and facilitates knowledge sharing in a transparent and scholarly manner.

Why Bibliography is Important in Academic and Professional Writing
A bibliography is essential to academic and professional writing as it reflects the writer's commitment to ethical practices and intellectual transparency. In academic contexts, a bibliography acknowledges the contributions of other scholars and researchers whose work has informed or supported the writer's arguments. This acknowledgment is not merely a formality but a critical practice that upholds academic integrity and prevents plagiarism, which is a serious violation in educational and research settings. By crediting sources, writers demonstrate respect for intellectual property and maintain the credibility of their work.

In professional writing, such as business reports, proposals, or technical documents, a bibliography marks professionalism and thorough research. It assures stakeholders and readers that the information presented is derived from credible and authoritative sources. This not only enhances the reliability of the document but also strengthens the writer's reputation as a diligent and trustworthy professional. Moreover, bibliographies help facilitate transparency, allowing readers to verify facts, delve deeper into the topic, or explore related materials for further study.

A bibliography also acts as a roadmap for readers and researchers. Listing all consulted sources provides a clear path for others to access and review the foundational materials of the work. This is especially important in collaborative and academic environments where building on existing knowledge is a central goal. Furthermore, in fields where peer review and scrutiny are common, a bibliography enables reviewers to evaluate the sources' relevance and accuracy, thereby contributing to the document's overall rigor and credibility.

In summary, a bibliography is a vital component that underpins the ethical, professional, and scholarly standards of academic and professional writing. It reflects the depth of research, enhances transparency, and fosters trust between the writer and the audience. Whether used to support academic endeavors or professional projects, a well-prepared bibliography ensures that knowledge is shared responsibly and with integrity.

What Are the Key Elements Typically Included in a Bibliography Entry?
A bibliography is essential to academic and professional writing, providing a detailed record of the sources used or consulted during the research process. Its purpose is to ensure proper attribution, enhance credibility, and allow readers to trace and explore the

references further. While the format and structure of a bibliography vary depending on the citation style (e.g., APA, MLA, Chicago), certain key elements are universally included. Here, we explore these fundamental components to help you understand and create accurate bibliography entries.

Author(s): The author's name is a cornerstone of any bibliography entry, as it identifies the creator of the work. For individual authors, the format typically follows the "Last name, First name" convention (e.g., Smith, John). If a source has multiple authors, their names are usually listed in the order provided in the original work, separated by commas. In cases where no individual author is identified, the organization or institution responsible for the work may be listed as the author, or the title of the work may take precedence.
Title of the Work: The title provides readers with the exact name of the source being cited. For standalone works like books or journals, the title is often italicized. For smaller works such as journal articles, book chapters, or web pages, the title is placed in quotation marks. Including the full title and subtitle, if applicable, ensures clarity and accuracy in identifying the source.
Publication Date: The publication date indicates when the source was published or made publicly available. This element is crucial for identifying the edition or version of the source, especially for works with multiple updates. For online sources or content that changes frequently, the publication or posting date is particularly important.
Publisher or Source: The name of the publisher or source refers to the entity responsible for producing or distributing the work. For books, this is the publishing company; for journal articles, it is typically the journal's title. This detail helps to establish the credibility of the source and assists readers in locating it.
Edition or Volume (if applicable): If the source is part of a series or exists in multiple editions, including this information is essential. For books, this might mean noting that it is the second edition. Journal articles often include the volume and issue numbers, which provide additional specificity.
Page Numbers (if applicable): When citing specific sections of a larger work, such as a book chapter or journal article, page numbers are included to direct readers to the exact location of the referenced information. This element is particularly important in academic writing, where precision is valued.
URL or DOI (for Online Sources): For digital sources, providing a URL (Uniform Resource Locator) or DOI (Digital Object Identifier) ensures that readers can easily access the original material. A DOI is a permanent and reliable identifier, making it the preferred option for scholarly articles and academic research.
Place of Publication (for Older Works): In certain citation styles, particularly older ones like Chicago or Turabian, the place of publication is included. This detail specifies the city where the work was published and was historically used to help identify different editions or imprints of a book.
Additional Elements (if applicable): Translator or Editor: For works translated or edited by someone other than the author, their names should be included.
Date Accessed: For online sources that may change over time, the date on which the material was last accessed is sometimes required (common in MLA style).
Series Title: For works that are part of a series, including the series name provides context about the source.
Examples of Bibliography Entries in Different Styles

APA Style:
Smith, J. (2021). Understanding Climate Change. Green Press.
MLA Style:
Smith, John. Understanding Climate Change. Green Press, 2021.
Chicago Style:
Smith, John. Understanding Climate Change. New York: Green Press, 2021.
The key elements of a bibliography entry—author, title, publication date, publisher, and more—form the foundation for accurately documenting sources. These components vary slightly depending on the citation style being used, but their purpose remains consistent: to provide transparency, credibility, and accessibility in written work. Whether you are an academic, a student, or a professional, understanding these elements ensures that your work adheres to ethical research practices and fosters trust among readers. By mastering the art of crafting precise bibliography entries, you contribute to the broader goal of maintaining integrity and reliability in communication and scholarship.

Types of Bibliography.
Bibliographies are an essential component of academic and professional writing, providing a systematic way to document sources used during research. Depending on their purpose and structure, bibliographies can take different forms. Two common types are Standard Bibliographies and Annotated Bibliographies.

A. Standard Bibliography:
A standard bibliography is a straightforward and organized list of all the sources that were referred to or consulted during the research and writing process of a document. It includes essential information about each source, such as the author's name, the title of the work, publication details, and, if applicable, additional identifiers like a URL or DOI for online materials. Unlike other types of bibliographies, a standard bibliography does not provide any commentary, summary, or evaluation of the sources. It simply serves as a record of the materials that influenced the work, even if they were not directly cited in the text. Typically arranged alphabetically by the author's last name or the title (if no author is provided), a standard bibliography ensures transparency, acknowledges intellectual contributions, and offers readers a resource to explore further.

Types of Standard Bibliographies: A standard bibliography can be categorized based on its focus, structure, and the types of sources it includes. Each type serves a specific purpose, catering to different research and documentation needs. Here are the main types of standard bibliographies:

Descriptive Bibliography: Descriptive bibliography is a specialized field of bibliography that focuses on documenting and analyzing the physical characteristics of books, manuscripts, or other printed materials. It examines tangible features such as format, binding, typography, illustrations, paper quality, pagination, and any unique production details. This type of bibliography treats a text as a