RESEARCH METHODOLOGY

Unit-I

- Introduction to Research
- Types of Research
- Significance of Research
- Research methods vs. Methodology
- Research process
- Criteria of Good Research.

Meaning

Research is the systematic and comprehensive study of a particular subject or problem to gain in-depth knowledge about it. Research is a process through which an individual or the researcher helps to search the definite or useful information from the number of respondents to evaluate or solve the problem-related questions. In fact, research is an art of scientific investigation or technique.

Research has been defined in a number of different ways.

According to Martyn Shuttleworth, research is any gathering of data, information and facts for the advancement of knowledge.

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

According to Fred Kerlinger, research is an organised enquiry designed and carried out to provide information for solving a problem.

Significance of the Research

To find out the real facts

A researcher evaluates or finds the real or exact information for problem-related questions.

To achieve the new thoughts-

Research is the process of finding the exact information through proper observation, optimization, and experiments. These are the scientific methods to find out or evaluate the information which is very necessary for evaluating the problem task.

To evaluate the information-

A researcher evaluates the information through various scientific approaches and methods, statistical analysis and procedures, and another type of tables and graphs.

To test a hypothesis-

The researcher does the causal relationship between the variables (it can also be said that the hypothesis testing research studies). The hypothesis testing study represents the number of actions like these terms:

- Making a formal statement,
- Selecting a significance level,
- Deciding the distribution use,
- Selecting a random sample and computing an appropriate value,
- Calculation of the probability,
- Comparing the probability.

To design or implement the research-

After the collection of all information, the researcher prepares the structure of a research design for the company so that they can easily describe or identify the structure of a particular research.

To improve the understanding-

The researcher helps to improve the understanding of a particular topic by asking what else needs to be evidenced before the research is purposeful, or what knowledge could be assembled from a more focused investigation, or scrutiny of the existing findings.

Types of Research

Basic Research

1. It is also known as pure or fundamental research.
2. This research is mainly conducted to increase knowledge base.
3. Basic research generates new ideas, principles and theories in different fields.
4. Basic research concentrates on fundamental principles and testing theories.

Applied Research

1. Applied research is mainly related with solving practical problems rather than focussing on knowledge expansion.
2. It is mainly used to find solutions to problems which occur on a daily basis and develop new innovative technologies.
3. The main aim of applied research is to provide better technologies for humans to enhance their standard of living.
4. Example: Investigating which treatment approach is the most effective for treating cancer patients whereas researching which strategies work best to motivate workers.

Quantitative Research

1. It usually involves collecting and converting data into numerical form so that statistical calculations can be made and conclusions drawn.
2. Objectivity is very vital in quantitative research.
3. Therefore, researchers try to avoid their own presence, behavior or attitude affecting the results.
4. The aim of quantitative research is to develop mathematical models, theories related to phenomenon. Quantitative research is mainly used in social sciences.

Qualitative Research

1. Qualitative research is the approach usually related with the social concept which emphasises the socially constructed nature of reality.
2. It is about recording, analysing and attempting to reveal the in debt meaning and significance of human behavior and experience, including conflicting beliefs, behaviors and emotions.
3. Data is collected in textual form on the basis of observation and communication with the participants, e.g., through participant observation, in-depth interviews and focuses groups.
4. It is not converted into numerical form and is not statistically analyzed.

Descriptive Research

1. Descriptive research is used to describe characteristics of an observable fact being studied.
2. Descriptive studies are structured in such a way that it cannot be changed frequently, so it can be said that they are rigid in nature.
3. Descriptive research answers questions such as who, when, where, what and how.
4. This type of research describes what exists and may help to reveal new facts and meaning.
5. The purpose of descriptive research is to observe, describe and document.

Exploratory Research

1. Exploratory research often relies on secondary research such as reviewing available literature, or qualitative approaches such as informal discussions with consumers, employees, management or competitors, and more formal approaches through in-depth interviews, focus groups, projective methods, case studies or pilot studies.

2. Exploratory research can mainly be conducted when researchers lack clear idea of the problem.
3. The results of exploratory research are not generally useful for decision-making, but they can provide major insight into a given situation.

Historical Research

1. It is defined as the type of research that examines past events or combinations of events to arrive at an account of what has happened in the past.
2. Historical research is carried out to discover the unknown; answer questions, recognise the relationship that the past has to the present; record and assess activities of individuals, agencies, or institutions; and assist in understanding the culture in which we live.

Experimental Research

1. It is commonly used in sciences such as sociology and psychology, physics, chemistry, biology, medicine, etc.
2. Experimental Research is mainly used when: there is time priority in a causal relationship (cause precedes effect) or there is uniformity in a causal relationship (a cause will always lead to the same effect) or the magnitude of the correlation is great.
3. Experimental research is important to society as it helps us to improve our daily lives.

Research Methods Vs. Methodology

Research Methods	Research Methodology
Research methods are the methods used by researchers to collect data to conduct research on a particular research topic.	A Research methodology is systematic approach to solve the research problem and to reach a new conclusion.
The objective of the research method is to find the solution.	The objective of the research methodology is to determine the solution by applying correct procedures of research.
Research methods are useful to apply during the latter stage of the research process.	Research methodologies are applied in the initial stage of the research being conducted.
Research methods are small part of research methodology.	A Research methodology is a multi-dimensional concept.
Research methods consist of various techniques where various studies and experiments are used to conduct research and reach an appropriate conclusion.	Research methodologies are used applied during the initial stage of the research to explain the purpose of chosen methods and how they will serve its function.
Research methods consist of different investigation techniques.	A research methodology is a systematic strategy to achieve the decided objective.
Research method encompasses of carrying out an experiment, survey, test and so on.	Research methodology encompasses different techniques which are used during the performance of the experiment, surveys, and test, etc.

Research Process

1. **Identifying the problem**- A well-identified problem will lead the researcher to accomplish all-important phases of the research process, starting from setting objectives to the selection of the research methodology.
2. **Reviewing literature** - A review of relevant literature is an integral part of the research process. It enables the researcher to formulate his problem in terms of the specific aspects of the general area of his interest that has not been so far researched.
3. **Setting research questions, objectives, and hypotheses** - An objective will precisely say what should be researched, to define the type of information that should be collected, and provide a framework for the scope of the study. The best expression of a research objective is a well-formulated, testable research hypothesis. A hypothesis is an unproven statement or proposition that can be refuted or supported by empirical data. Hypothetical statements assert a possible answer to a research question.
4. **Choosing the study design**- The research design is the blueprint or framework for fulfilling objectives and answering research questions. It is a master plan specifying the methods and procedures for collecting, processing, and analyzing the collected data.
5. **Deciding on the sample design** - Sampling is an important and separate step in the research process. The basic idea of sampling is that it involves any procedure that uses a relatively small number of items or portions (called a sample**)** of a universe (called population**)** to conclude the whole population.
6. **Collecting data** - The gathering of data may range from simple observation to a large-scale survey in any defined population. There are many ways to collect data. The most common means for collecting quantitative data is the structured interview. Studies that obtain data by interviewing respondents are called surveys. Data can also be collected by using self-administered questionnaires. Telephone interviewing is another way in which data may be collected.
7. **Processing and analyzing data** - Data processing generally begins with the editing and coding of data. Data analysis usually involves reducing accumulated data to a manageable size, developing summaries, searching for patterns, and applying statistical techniques for understanding and interpreting the findings in the light of the research questions.
8. **Writing the report** - The entire task of a research study is accumulated in a document called a proposal. A research proposal is a work plan, prospectus, outline, an offer, a statement of intent or commitment from an individual researcher or an organization to produce a product or render a service to a potential client or sponsor. The proposal will be

prepared to keep in view the sequence presented in the research process. The proposal tells us what, how, where, and to whom it will be done.

Criteria of Good Research

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.
8. Good research must be a systematic
9. Good research must be a logical
10. Good research must be a empirical
11. Good research must be a replicable

Research Design

Meaning

A research design is a framework or blueprint for conducting the marketing research project. It details the procedures necessary for obtaining the information needed to structure or solve marketing research problems. In simple words it is the general plan of how you will go about your research.

Definitions

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".

According to Green and Tull "A research is the specification of methods and procedures for acquiring the information needed. It is the overall operational pattern or framework of the project that stipulates what information is to be collected from which sources by what procedures".

Need of Research Design

1. It reduces inaccuracy;
2. Helps to get maximum efficiency and reliability;
3. Eliminates bias and marginal errors;
4. Minimizes wastage of time;
5. Helpful for collecting research materials;
6. Helpful for testing of hypothesis;
7. Gives an idea regarding the type of resources required in terms of money, manpower, time, and efforts;
8. Provides an overview to other experts;
9. Guides the research in the right direction.

Features of Good Research Design

1. A good research design is often believed to possess characteristic features like flexibility, appropriateness, efficiency, economically sound and so on.
2. A design which minimizes bias and maximizes the reliability of data is interpreted as a good design.
3. A design as good depends too much upon the objective of the research problem and also the nature of the problem under investigation.

4. Objectivity: A good research design should permit fairly objective measuring instruments in which every observer visualizing a performance comes to the same conclusion.
5. Reliability: Reliable knowledge means any claim that is substantiated as trustworthy for a given purpose.
6. Validity: Validity implies self-consistency or absence of self-contradiction. It is identified with formal truth or self-consistency. A valid reasoning conforms to the rules of correct reasoning. It is that type of reasoning where conclusions automatically follow from the premises legitimately.
7. Generalisability: The degree of generalisability is known in terms of the replicability and reproducibility of the findings in spite of different measures and settings respectively.

Different Research Design

1. Exploratory Research

It is the primary stage of research and the purpose of this research is to achieve new insights into a phenomenon. This research is one which has the purposes of formulating a problem for more accurate investigating a problem for more accurate investigation or for developing a hypothesis.

Steps of Exploratory Research

Survey of Literature

An exploratory is concerned with an area of subject matter in which hypothesis have not got been formulated. The researchers' task then is to review the available material with an eye on the possibilities of developing a hypothesis from it. The researcher has to gather these various hypothesis with a view to evaluate their usefulness for further research and to consider whether they suggest new hypothesis.

The Experience of Survey

Many people in the course of their day-to-day experience, by virtue of their peculiar placement as officials, social workers, professional etc., are in a position to observe the effects of different policy actions and to relate these to problems of human welfare.

Following are the ways of Experience Survey

1. **Best Hypothesis:** By the help of experience survey best hypothesis can be made.
2. **Behavioral Possibility:** It introduces the different study of behavioral possibility.
3. **Knowledge of Facilities:** By the help of knowledge of facilities source of important knowledge can be found.

4. **Control Factor:** By the help of related factors controlled and un-controlled knowledge can be found.
5. **Knowledge of Helping Persons:** By the help of this we found that type of knowledge which is related to the agencies, business worker and another person which is helpful of study

2. Descriptive Research

It is also known as statistical research; this describes event as they exist. It is used to identify and obtain information on characteristic of a particular issue like community, group or people. In other words, this type of research describes social events, social structure, social situations, etc. The observer observes and describe what did he find? Descriptive research answers the questions, what, who, where, how and when. It is used to study the current situation. It is widely used in the physical and natural science. But it is used more common in the social sciences, as in socioeconomic survey and job and activity analysis.

Steps of Descriptive Research

1.The Clear discrimination of objective of Research

First step is to select the main purpose of research it is necessary because for proper study of research. Without main aim and purpose research cannot go properly.

2.Determination of the Method of Data Collection

For any research method, data collection is necessary which type of research the researcher want, he must have to select the method like questionnaire observation, interview etc. of their research.

3.Selection of Sampling

The place which is selected by the researcher, there must be many people so it is difficult to make contact with all persons this the researcher select some people these selected people are known as sampling selection of sampling have some essential terms.

4.Real Collection of Data

For real collection of data, the researcher must have to in his real research field, and it is collected in a selected step at the time of data collection reality is necessary for investigation.

5.Analysis of Achieved conclusion

After the collection of data the researcher makes the conclusion of the whole research or investigation for conclusion coding, tabulating and graph representation is used.

3. Explanatory Research Design

When the purpose of the study is to explore a new universe, one that has not been studied earlier, and the research design is called explanatory. The research is mainly concerned with reasons or why factor about some incident. It does not involve comparison and factors of change. For instance, research on ,,violence against bloomed" conducted by this author described not only varieties of violence like criminal assault, kidnapping, murder, severely death, etc. but also explain why men commit violence because of personality traits like dominance, doubt, possession, etc. and situational factors like resourcefulness, alcoholism, and stresses, and so on. The research purpose in this case is to gain familiarity in unknown areas. The explanatory study always carries with it a set of concept that guide the researcher to look for the facts.

4. Experimental Research Design

The Research design that is used to test a Research Design of causal relationship under controlled situation is called experimental design. We should remember that an experiment is an observation under controlled conditions or in other words, we can say that it is a design in which some of the variables being studied are manipulated or which seek to control the condition within which persons are observed. Controlling of conditions means that the condition should not be allowed to change while the experimentation is going on. In experimentation, various types of evidence have to be, controlled so that the alternative hypothesis can be tested, and causal relationship may be found out.

Unit-III

- Design of sample surveys
- Sample survey Vs census survey
- Types of sampling designs
- Non probability sampling
- Probability sampling
- Complex random sampling design.

Introduction

A group of individuals having same characteristics in same surrounding is known as population. According to A. C. Rosander "A population is the totality of objects under consideration". In short, group of all objects which are coming under the definition of investigation unit. For example, the group of employees of a institute shall be the population for every investigation related to the employees. Individuals of the population are known as a unit or a element in population.

Types of Population

1.Finite or Infinite Population

In a finite population the number of units is finite i.e. number of students in a class, number of employees in a college. In a infinite population, the number of units are infinite, for example the number of hair in head etc. and also if the units of a population are unable to count and the limits cannot be made then the population is known as Infinite population, for example stars in sky, leaves in tree, number of viewers of a T.V. serial, etc.

2.Real or Hypothetical Population

Population of a concrete subject is called real population. For example, students in a university, employees of an institution. In a hypothetical population the subjects are not concrete, whether they are hypothetical. For example, the population made by the number of Heads or Tails based on the trial of a coin.

Design of Sample Survey

A finite subset of statistical individuals in a population is called a sample and the number of individuals in a sample is called the sample size. Sample is often used in our day to day practical life. For example, in a shop we assess the quality of rice, wheat or any other commodity by taking a handful of it from the bag and then decide to purchase it or not. A house wife normally tests the cooked food to find if they are properly cooked and contain the proper quantity of salt. If the population is infinite, census is not possible. Also, if

the units are destroyed in the course of inspection, 100% inspection though is not possible at all desirable. But even if the population is finite or the inspection is not destructive, 100% inspection is not taken recourse too, because of the administrative, financial and time factor related problems. So we take the help of sampling.

Census

A well-organised procedure of gathering, recording and analysing information regarding the members of the population is called a census. It is an official and complete count of the universe, wherein each and every unit of the universe is included in the collection of data. Here universe implies any region (city or country), a group of people, through which the data can be acquired. Under this technique, the enumeration is conducted about the population by considering the entire population. Hence this method requires huge finance, time and labour for gathering information. This method is useful, to find out the ratio of male to female, the ratio of literate to illiterate people, the ratio of people living in urban areas to the people in rural areas.

Difference between Census and Sample Surveys

Parameter	Census	Sample Survey
Definition	A statistical method that studies all the units or members of a population.	A statistical method that studies only a representative group of the population, and not all its members.
Calculation	Total/Complete	Partial
Time involved	It is a time-consuming process.	It is a quicker process.
Cost involved	It is a costly method.	It is a relatively inexpensive method.
Accuracy	The results obtained are accurate as each member is surveyed. So, there is a negligible error.	The results are relatively inaccurate due to leaving out of items from the sample. The resulting error is large.
Reliability	Highly reliable	Low reliability
Error	Not present	The smaller the sample size, the larger the error.
Relevance	This method is suited for heterogeneous data.	This method is suited for homogeneous data.

Sampling Error

The error which arises only in sample survey is termed as sampling error. This error arises because in sample survey a part of the population is only studied.

Non-Sampling Error

The non-sampling error arises at the stages of observation, ascertainment and processing of the data. This is the reason why the non-sampling error presents in both the census and the sample survey. Non-sampling error can occur at every stage of the planning or execution of census or sample survey.

Types of Sampling Designs

When you conduct research about a group of people, it's rarely possible to collect data from every person in that group. Instead, you select a sample. The sample is the group of individuals who will actually participate in the research. To draw valid conclusions from your results, you have to carefully decide how you will select a sample that is representative of the group as a whole.

Probability Sampling

Probability sampling is a sampling technique in which researchers choose samples from a larger population using a method based on the theory of probability. This sampling method considers every member of the population and forms samples based on a fixed process.

For example, in a population of 1000 members, every member will have a 1/1000 chance of being selected to be a part of a sample. Probability sampling eliminates bias in the population and gives all members a fair chance to be included in the sample.

There are four types of probability sampling techniques:

- **Simple Random Sampling:** One of the best probability sampling techniques that helps in saving time and resources, is the Simple Random Sampling method. It is a reliable method of obtaining information where every single member of a population is chosen randomly, merely by chance. Each individual has the same probability of being chosen to be a part of a sample.

  For example, in an organization of 500 employees, if the HR team decides on conducting team building activities, it is highly likely that they would prefer picking chits out of a bowl. In this case, each of the 500 employees has an equal opportunity of being selected.

- **Cluster Sampling:** Cluster sampling is a method where the researchers divide the entire population into sections or clusters that represent a population. Clusters are identified and included in a sample based on demographic parameters like age, sex, location, etc. This makes it very simple for a survey creator to derive effective inference from the feedback. For example, if the United States government wishes to evaluate the number of immigrants living in the Mainland US, they can divide it into clusters based on states such as California, Texas, Florida, Massachusetts, Colorado, Hawaii, etc. This way of conducting a survey will be more effective as the results will be organized into states and provide insightful immigration data.

- **Systematic Sampling:** Researchers use the systematic sampling method to choose the sample members of a population at regular intervals. It requires the selection of a starting

point for the sample and sample size that can be repeated at regular intervals. This type of sampling method has a predefined range, and hence this sampling technique is the least time-consuming.

For example, a researcher intends to collect a systematic sample of 500 people in a population of 5000. He/she numbers each element of the population from 1-5000 and will choose every 10th individual to be a part of the sample (Total population/ Sample Size = 5000/500 = 10).

- **Stratified Random Sampling:** Stratified random sampling is a method in which the researcher divides the population into smaller groups that don't overlap but represent the entire population. While sampling, these groups can be organized and then draw a sample from each group separately.

  For example, a researcher looking to analyze the characteristics of people belonging to different annual income divisions will create strata (groups) according to the annual family income. Eg – less than $20,000, $21,000 – $30,000, $31,000 to $40,000, $41,000 to $50,000, etc. By doing this, the researcher concludes the characteristics of people belonging to different income groups. Marketers can analyze which income groups to target and which ones to eliminate to create a roadmap that would bear fruitful results.

Uses of probability sampling

1. **Reduce Sample Bias:** Using the probability sampling method, the bias in the sample derived from a population is negligible to non-existent. The selection of the sample mainly depicts the understanding and the inference of the researcher. Probability sampling leads to higher quality data collection as the sample appropriately represents the population.
2. **Diverse Population:** When the population is vast and diverse, it is essential to have adequate representation so that the data is not skewed towards one demographic. For example, if Square would like to understand the people that could make their point-of-sale devices, a survey conducted from a sample of people across the US from different industries and socio-economic backgrounds helps.
3. **Create an Accurate Sample:** Probability sampling helps the researchers plan and create an accurate sample. This helps to obtain well-defined data.

Non-Probability Sampling

The non-probability method is a sampling method that involves a collection of feedback based on a researcher or statistician's sample selection capabilities and not on a fixed selection process. In most situations, the output of a survey conducted with a non-probable sample leads to skewed results, which may not represent the desired target population. But, there are situations such as the preliminary stages of research or cost constraints for conducting research, where non-probability sampling will be much more useful than the other type.

There are four types of non probability sampling techniques:

- **Convenience Sampling:** This method is dependent on the no difficulty of access to subjects such as surveying customers at a mall on a busy street. It is usually termed as convenience sampling, because of the researcher's easy of carrying it out and getting in touch with the subjects. This non-probability sampling method is used when there is time and cost limitations in collecting feedback.

  For example, startups and NGOs usually conduct convenience sampling at a mall to distribute leaflets of upcoming events or promotion of a cause – they do that by standing at the mall entrance and giving out pamphlets randomly.
- **Judgmental or Purposive Sampling:** Judgemental or purposive samples are formed by the discretion of the researcher. Researchers purely consider the purpose of the study, along with the understanding of the target audience. For instance, when researchers want to understand the thought process of people interested in studying for their master's degree. The selection criteria will be: "Are you interested in doing your masters in …?" and those who respond with a "No" are excluded from the sample.
- **Snowball Sampling:** Snowball sampling is a sampling method that researchers apply when the subjects are difficult to trace. For example, it will be extremely challenging to survey shelterless people or illegal immigrants. In such cases, using the snowball theory, researchers can track a few categories to interview and derive results. Researchers also implement this sampling method in situations where the topic is highly sensitive and not openly discussed for example, surveys to gather information about HIV Aids.
- **Quota Sampling:** In Quota sampling, the selection of members in this sampling technique happens based on a pre-set standard. In this case, as a sample is formed based on specific attributes, the created sample will have the same qualities found in the total population. It is a rapid method of collecting samples.

Uses of non-probability sampling

- **Create a hypothesis:** Researchers use the non-probability sampling method to create an assumption when limited to no prior information is available. This method helps with the immediate return of data and builds a base for further research.
- **Exploratory research:** Researchers use this sampling technique widely when conducting qualitative research, pilot studies, or exploratory research.
- **Budget and time constraints:** The non-probability method when there are budget and time constraints, and some preliminary data must be collected. Since the survey design is not rigid, it is easier to pick respondents at random and have them take the survey or questionnaire.

Complex Random Sampling Designs

Complex random sampling designs are probability sampling done with restricted sampling techniques. They are also called mixed sampling designs as they tend to combine probability and non-probability sampling procedures during sample selection.

Some of the popular complex random sampling designs are as follows:

1. **Systematic sampling**: The researchers sometimes select every *i*th item from a list, this is known as systematic sampling. The first unit is a random number and the next unit onwards they are selected at the same fixed intervals.
2. **Stratified sampling**: In a very diverse universe stratified sampling is used were the population is divided into several groups that are more similar and then items are selected from each strata as a sample. The strata is a subjective choice of the researcher based on his experience and judgment by using simple random sampling.
3. **Cluster sampling**: In cluster sampling within the population there might be similar groups these are divided into a number of small homogeneous subdivisions then some of these clusters are randomly selected as sample. Cluster sampling is highly economic. The difference between stratified sampling and cluster sampling is that in stratified sampling a random sample is drawn from each of the strata, whereas in cluster sampling only the selected clusters are studied.
4. **Area sampling:** In area sampling a large area is divided into smaller parts and then samples are selected randomly. This is a type of cluster sampling were the cluster of units is based on geographic area.
5. **Multi-stage sampling**: Multi-stage sampling is a complex type of cluster sampling. Multi-stage sampling is used in researches where the entire universe is very large, for example the

entire country; the researcher selects samples in various levels. The researcher after selecting clusters from all universe than randomly selects elements from each cluster. This type of sampling is cost effective and easy to administer.

6. **Probability proportional to size (PPS) sampling**: Probability proportional to size (PPS) sampling: Sometimes cluster sampling units lack equal number of elements; in such cases the researcher uses a random selection process where the probability of selection of each sub group is proportional to the size of the cluster. The actual numbers selected are indicative of the clusters chosen and selected. PPS avoids under representation of any one group.
7. **Sequential sampling**: This is a complex sampling design was the size of the sample is not fixed earlier but is determined according the need of the researcher. In this type of sampling method, the researcher does his research on a particular sample if not satisfied takes another sample unit and so on. The researchers keeps fine tuning the experiment and decides only after doing the experiment whether more samples are needed or not.

Unit - IV

Data Collection and preparation

Meaning

Primary data is a type of data that is collected by researchers directly from main sources through interviews, surveys, experiments, etc. Primary data are usually collected from the source where the data originally originates from and are regarded as the best kind of data in research. The sources of primary data are usually chosen and tailored specifically to meet the demands or requirements of a particular research. Also, before choosing a data collection source, things like the aim of the research and target population need to be identified.

Primary Data Collection Methods

Interviews:

Interview is a method of data collection that involves two groups of people, where the first group is the interviewer (the researcher(s) asking questions and collecting data) and the interviewee (the subject or respondent that is being asked questions). The questions and responses during an interview may be oral or verbal as the case may be.

Interviews can be carried out in two ways, namely; in-person interviews and telephonic interviews. An in-person interview requires an interviewer or a group of interviewers to ask questions from the interviewee in a face to face fashion.

It can be direct or indirect, structured or structure, focused or unfocused, etc. Some of the tools used in carrying out in-person interviews include a notepad or recording device to take note of the conversation very important due to human forgetful nature.

Telephonic interviews, on the other hand, are carried out over the phone through ordinary voice call or video calls. The parties involved may decide to use video calls like Skype to carry out interviews. A mobile phone, Laptop, Tablet or desktop computer with an internet connection is required for this.

Pros

- In-depth information can be collected.
- Non-response and response bias can be detected.
- The samples can be controlled.

Cons

- It is more time-consuming.
- It is expensive.
- The interviewer may be biased.

Surveys & Questionnaires

Surveys and questionnaires are similar tools used in collecting primary data. They are a group of questions typed or written down and sent to the sample of study to give responses. After giving the required responses, the survey is given back to the researcher to record. It is advisable to conduct a pilot study where the questionnaires are filled by experts and meant to assess the weakness of the questions or techniques used.

There are two main types of surveys used for data collection, namely; online and offline surveys. Online surveys are carried out using internet-enabled devices like mobile phones, PCs, Tablets, etc.

They can be shared with respondents through email, websites, or social media. Offline surveys, on the other hand, do not require an internet connection for it to be carried out.

The most common type of offline survey is paper-based surveys. However, there are also offline surveys like Form plus that can be filled with a mobile device without access to an internet connection.

This kind of survey is called online-offline surveys because they can be filled offline but require an internet connection to be submitted.

Pros

- Respondents have adequate time to give responses.
- It is free from the bias of the interviewer.
- They are cheaper compared to interviews.

Cons

- A high rate of non-response bias.
- It is inflexible and can't be changed once sent.
- It is a slow process.

Observation

Observation method is mostly used in studies related to behavioral science. The researcher uses observation as a scientific tool and method of data collection. Observation as a data collection tool is usually systematically planned and subjected to checks and controls.

There are different approaches to the observation method structured or unstructured, controlled or uncontrolled, and participant, non-participant, or disguised approach.

The structured and unstructured approach is characterized by careful definition of subjects of observation, style of observer, conditions, and selection of data. An observation process that satisfies this is said to be structured and vice versa.

A controlled and uncontrolled approach signifies whether the research took place in a natural setting or according to some pre-arranged plans. If an observation is done in a natural setting, it is uncontrolled but becomes controlled if done in a laboratory.

Before employing a new teacher, academic institutions sometimes ask for a sample teaching class to test the teacher's ability. The evaluator joins the class and observes the teaching, making him or her participant.

The evaluation may also decide to observe from outside the class, becoming a non-participant. An evaluator may also be asked to stay in class and disguise as a student, in order to carry out a disguised observation.

Pros

- The data is usually objective.
- Data is not affected by past or future events.

Cons

- The information is limited.
- It is expensive

Focus Groups

Focus Groups are gathering of two or more people with similar characteristics or who possess common traits. They seek open-ended thoughts and contributions from participants.

A focus group is a primary source of data collection because the data is collected directly from the participant. It is commonly used for market research, where a group of market consumers engage in a discussion with a research moderator.

It is slightly similar to interviews, but this involves discussions and interactions rather than questions and answers. Focus groups are less formal and the participants are the ones who do most of the talking, with moderators there to oversee the process.

Pros

- It incurs a low cost compared to interviews. This is because the interviewer does not have to discuss with each participant individually.
- It takes lesser time too.

Cons

- Response bias is a problem in this case because a participant might be subjective to what people will think about sharing a sincere opinion.
- Group thinking does not clearly mirror individual opinions.

Experiments

An experiment is a structured study where the researchers attempt to understand the causes, effects, and processes involved in a particular process. This data collection method is

usually controlled by the researcher, who determines which subject is used, how they are grouped and the treatment they receive.

During the first stage of the experiment, the researcher selects the subject which will be considered. Some actions are therefore carried out on these subjects, while the primary data consisting of the actions and reactions are recorded by the researcher.

After which they will be analyzed and a conclusion will be drawn from the result of the analysis. Although experiments can be used to collect different types of primary data, it is mostly used for data collection in the laboratory.

Pros

- It is usually objective since the data recorded are results of a process.
- Non-response bias is eliminated.

Cons

- Incorrect data may be recorded due to human error.
- It is expensive.

Advantages of Primary Data

Specific

Collecting your own data allows you the freedom to address issues specific to your business, or research aim. In this case, the data collected is exactly what the researcher wants and needs.

The researcher reports it in a way that benefits the current situation of the organization or research. For example, when doing market research for a product, the data collected will be specifically for the product in question.

Accurate:

Primary data is much more accurate compared to secondary data. For example, when collecting statistical data from online sources, you are at risk of coming across false data.

This is because the data available online is not regulated, unlike the data you collect yourself. This is very common in journalism, where blogs share unverified and exaggerated information just to gain cheap traffic.

Ownership

The data collected through a primary source is usually owned by the researcher, who may choose to either share or not share with others. In the market research example stated earlier, researchers may keep the results to themselves and not give access to their competitors who may want to use the information. Also, a researcher can choose to sell the data to make a huge amount of money because they own it.

Up to date information

The data collected from primary sources are up-to-date, unlike that of the secondary sources. It collects data in real-time and does not take information from stale and outdated sources.

For example, when the population of a community is something that continues to fluctuate as people die and children are born. Going by the National Census, one may not get accurate results of the population, and can only settle for estimates.

Control:

A researcher can easily control the research design and methods to be used. As a researcher, you can choose which subject to consider, and also control how the information is gathered.

There are no limitations to the kind and amount of data that can be generated by the researcher.

Disadvantages of Primary Data

Expensive:

Compared to secondary data, the data collection process for primary data is very expensive. No matter how little the research is, at least one professional researcher will need to be employed to carry out the research. Also, the research process itself may cost some amount of money. How expensive it is, will be determined by which method is used in carrying out the research.

Time-consuming

Going from the starting point of making the decision to perform the research, to the point of generating data, the time is much longer compared to the time it takes to acquire secondary data. Each stage of the primary data collection process requires much time for execution.

Feasibility

It is not always feasible to carry out primary research because of the volume and unrealistic demands that may be required. For example, it will be unrealistic for a company to do a census of the people living in a community, just to measure the size of their target market.

A more sensible thing to do in this case will be to use the data of the recorded census to know the demography of people in that community.

Guidelines for Constructing Questionnaire / Schedule

A questionnaire is a form prepared and distributed to secure responses to certain questions. It is a tool for obtaining response to questions by using a form which the

respondent fills by himself. It is a systematic compilation of questions that are submitted to a group of population called samples from whom the required information is acquired. It is that form of inquiry which contains a systematically compiled and organized series of questions that are to be sent to the population samples.

Steps involved in designing a questionnaire

The investigator cannot get a readymade questionnaire appropriate for his study. He has to prepare it for himself. He should keep in mind the following steps and suggestions.

1. While planning and constructing his questionnaire, the investigator should secure all the help he can. He should study other questionnaires and submit his items for critical evaluation. He should consult those who have experience in questionnaire construction.
2. He should obtain a thorough grasp of the field in which he is constructing questionnaire. He must have a clear understanding of the objectives of the study and of the nature of the data needed.
3. Constructing a questionnaire calls for numerous revision. Variations of the same questions should be submitted to experimental trial. The same question posed in different ways brings out different response.
4. The content of question should elicit valid and reliable answers. Each question must be justified on the basis of its contribution to the overall purpose of the study.
5. Each question must be absolutely clear not only to the maker but also to the listener.
6. If the desired information is delicate or confidential in nature, he should provide for anonymous response.
7. The questionnaire may not be desirable for all. It should be sent only to those who possess the required information.
8. The questions should be so worded as to allay any fears, suspicion, hesitation, embarrassment or hostility of the respondent.
9. Some specific questions may be asked in order to check the truthfulness of answers to general questions.
10. The items should be placed psychologically or logically – in a sound sequence – simple, interesting neutral questions preceding the more difficult ones.
11. He should include a courteous, carefully constructed covering letter to explain the purpose and importance of the study.
12. The respondents often cause delay while returning completed questionnaires. To avoid this, a vigorous follow up is necessary.

Difference between Schedule and Questionnaire

S.No	Questionnaire	Schedule
1.	Questionnaire is generally sent through mail to informants to be answered as specified in a covering letter, but otherwise without further assistance from the sender.	A schedule is generally filled by the research worker or enumerator, who can interpret the questions when necessary.
2.	Data collection is cheap and economical as the money is spent in preparation of questionnaire and in mailing the same to respondents.	Data collection is more expensive as money is spent on enumerators and in imparting trainings to them. Money is also spent in preparing schedules.
3.	Non response is usually high as many people do not respond and many return the questionnaire without answering all questions. Bias due to non response often remains indeterminate.	Non response is very low because this is filled by enumerators who are able to get answers to all questions. But even in this their remains the danger of interviewer bias and cheating.
4.	It is not clear that who replies.	Identity of respondent is not known.
5.	The questionnaire method is likely to be very slow since many respondents do not return the questionnaire.	Information is collected well in time as they are filled by enumerators.
6.	No personal contact is possible in case of questionnaire as the questionnaires are sent to respondents by post who also in turn returns the same by post.	Direct personal contact is established
7.	This method can be used only when respondents are literate and cooperative.	The information can be gathered even when the respondents happen to be illiterate.
8.	Wider and more representative distribution of sample is possible.	There remains the difficulty in sending enumerators over a relatively wider area.
9.	Risk of collecting incomplete and wrong information is relatively more under the questionnaire method, when people are unable to understand questions properly.	The information collected is generally complete and accurate as enumerators can remove difficulties if any faced by respondents in correctly understanding

		the questions. As a result the information collected through schedule is relatively more accurate than that obtained through questionnaires.
10.	The success of questionnaire methods lies more on the quality of the questionnaire itself.	It depends upon the honesty and competence of enumerators
11.	The physical appearance of questionnaire must be quite attractive.	This may not be the case as schedules are to be filled in by enumerators and not by respondents.
12.	This is not possible when collecting data through questionnaire.	Along with schedule observation method can also be used.

Collection of secondary data

Secondary data is one of the two main types of data, where the second type is the primary data. These two data types are very useful in research and statistics, but for the sake of this article, we will be restricting our scope to secondary data.

Meaning

Secondary data is the data that has already been collected through primary sources and made readily available for researchers to use for their own research. It is a type of data that has already been collected in the past.

A researcher may have collected the data for a particular project, then made it available to be used by another researcher. The data may also have been collected for general use with no specific research purpose like in the case of the national census.

A data classified as secondary for a particular research may be said to be primary for another research. This is the case when a data is being reused, making it a primary data for the first research and secondary data for the second research it is being used for.

Sources of Secondary Data

A source of secondary data includes books, personal sources, journal, newspaper, website, government record etc. Secondary data are known to be readily available compared to that of primary data. It requires very little research and need for manpower to use these sources.

Books

Books are one of the most traditional ways of collecting data. Today, there are books available for all topics you can think of. When carrying out research, all you have to do is

look for a book on the topic being researched on, then select from the available repository of books in that area. Books, when carefully chosen are an authentic source of authentic data and can be useful in preparing a literature review.

Published Sources

There are a variety of published sources available for different research topics. The authenticity of the data generated from these sources depends majorly on the writer and publishing company. Published sources may be printed or electronic as the case may be. They may be paid or free depending on the writer and publishing company's decision.

Unpublished Personal Sources

This may not be readily available and easily accessible compared to the published sources. They only become accessible if the researcher shares with another researcher who is not allowed to share it with a third party.

For example, the product management team of an organization may need data on customer feedback to assess what customers think about their product and improvement suggestions. They will need to collect the data from the customer service department, which primarily collected the data to improve customer service.

Journal

Journals are gradually becoming more important than books these days when data collection is concerned. This is because journals are updated regularly with new publications on a periodic basis, therefore giving to date information. Also, journals are usually more specific when it comes to research. For example, we can have a journal on, "Secondary data collection for quantitative data" while a book will simply be titled, "Secondary data collection".

Newspapers

In most cases, the information passed through a newspaper is usually very reliable. Hence, making it one of the most authentic sources of collecting secondary data. The kind of data commonly shared in newspapers is usually more political, economic, and educational than scientific. Therefore, newspapers may not be the best source for scientific data collection.

Websites

The information shared on websites are mostly not regulated and as such may not be trusted compared to other sources. However, there are some regulated websites that only share authentic data and can be trusted by researchers. Most of these websites are usually government websites or private organizations that are paid, data collectors.

Blogs

Blogs are one of the most common online sources for data and may even be less authentic than websites. These days, practically everyone owns a blog and a lot of people use these blogs to drive traffic to their website or make money through paid ads. Therefore, they cannot always be trusted. For example, a blogger may write good things about a product because he or she was paid to do so by the manufacturer even though these things are not true.

Diaries

They are personal records and as such rarely used for data collection by researchers. Also, diaries are usually personal, except for these days when people now share public diaries containing specific events in their life. A common example of this is Anne Frank's diary which contained an accurate record of the Nazi wars.

Government Records

Government records are a very important and authentic source of secondary data. They contain information useful in marketing, management, humanities, and social science research. Some of these records include; census data, health records, education institute records, etc. They are usually collected to aid proper planning, allocation of funds, and prioritizing of projects.

Podcasts

Podcasts are gradually becoming very common these days, and a lot of people listen to them as an alternative to radio. They are more or less like online radio stations and are generating increasing popularity. Information is usually shared during podcasts, and listeners can use it as a source of data collection.

Some other sources of data collection include:

- Letters
- Radio stations
- Public sector records.
- secondary-data-collection

Secondary Data Collection Tools

Popular tools used to collect secondary data include; bots, devices, library, etc. In order to ease the data collection process from the sources of secondary data highlighted above, researchers use these important tools which are explained below.

Bots

There are lots of data online and it may be difficult for researchers to browse through all these data and find what they are actually looking for. In order to ease this process of data collection, programmers have created bots to do an automatic web scraping for relevant data.

These bots are "software robots" programmed to perform some task for the researcher. It is common for businesses to use bots to pull data from forums and social media for sentiment and competitive analysis.

Internet-Enabled Devices

This could be a mobile phone, PC, or tablet that has access to an internet connection. They are used to access journals, books, blogs, etc. to collect secondary data.

Library

This is a traditional secondary data collection tool for researchers. The library contains relevant materials for virtually all the research areas you can think of, and it is accessible to everyone.

A researcher might decide to sit in the library for some time to collect secondary data or borrow the materials for some time and return when done collecting the required data.

Radio

Radio stations are one of the secondary sources of data collection, and one needs a radio to access it. The advent of technology has even made it possible to listen to radio on mobile phones, deeming it unnecessary to get a radio.

Advantages of Secondary Data

Ease of Access

Most of the sources of secondary data are easily accessible to researchers. Most of these sources can be accessed online through a mobile device. People who do not have access to the internet can also access them through print. They are usually available in libraries, book stores, and can even be borrowed from other people.

Inexpensive

Secondary data mostly require little to no cost for people to acquire them. Many books, journals, and magazines can be downloaded for free online. Books can also be borrowed for free from public libraries by people who do not have access to the internet. Researchers do not have to spend money on investigations, and very little is spent on acquiring books if any.

Time-Saving

The time spent on collecting secondary data is usually very little compared to that of primary data. The only investigation necessary for secondary data collection is the process of sourcing for necessary data sources. Therefore, cutting the time that would normally be spent on the investigation. This will save a significant amount of time for the researcher

Longitudinal and Comparative Studies

Secondary data makes it easy to carry out longitudinal studies without having to wait for a couple of years to draw conclusions. For example, you may want to compare the

country's population according to census 5 years ago, and now. Rather than waiting for 5 years, the comparison can easily be made by collecting the census 5 years ago and now.

Generating new insights

When re-evaluating data, especially through another person's lens or point of view, new things are uncovered. There might be a thing that wasn't discovered in the past by the primary data collector, which secondary data collection may reveal. For example, when customers complain about difficulty using an app to the customer service team, they may decide to create a user guide teaching customers how to use it. However, when a product developer has access to this data, it may be uncovered that the issue came from and UI/UX design which needs to be worked on.

Disadvantages of Secondary Data

Data Quality:

The data collected through secondary sources may not be as authentic as when collected directly from the source. This is a very common disadvantage with online sources due to a lack of regulatory bodies to monitor the kind of content that is being shared. Therefore, working with this kind of data may have negative effects on the research being carried out.

Irrelevant Data:

Researchers spend so much time surfing through a pool of irrelevant data before finally getting the one they need. This is because the data was not collected mainly for the researcher.

In some cases, a researcher may not even find the exact data he or she needs, but have to settle for the next best alternative.

Exaggerated Data

Some data sources are known to exaggerate the information that is being shared. This bias may be some to maintain a good public image or due to a paid advert. This is very common with many online blogs that even go a bead to share false information just to gain web traffic. For example, a FinTech startup may exaggerate the amount of money it has processed just to attract more customers. A researcher gathering this data to investigate the total amount of money processed by FinTech startups in the US for the quarter may have to use this exaggerated data.

Outdated Information

Some of the data sources are outdated and there are no new available data to replace the old ones. For example, the national census is not usually updated yearly. Therefore, there

have been changes in the country's population since the last census. However, someone working with the country's population will have to settle for the previously recorded figure even though it is outdated.

Preparing Data

After data collection, the researcher must prepare the data to be analyzed. Organizing the data correctly can save a lot of time and prevent mistakes. Most researchers choose to use a database or statistical analysis program (e.g. Microsoft Excel, SPSS) that they can format to fit their needs and organize their data effectively. Once the data has been entered, it is crucial that the researcher check the data for accuracy. This can be accomplished by spot-checking a random assortment of participant data groups, but this method is not as effective as re-entering the data a second time and searching for discrepancies. This method is particularly easy to do when using numerical data because the researcher can simply use the database program to sum the columns of the spreadsheet and then look for differences in the totals. One of the best methods of checking for accuracy is to use a specialized computer program that cross-checks double-entered data for discrepancies

Data Preparation process

- **Questionnaire checking**: Questionnaire checking involves eliminating unacceptable questionnaires. These questionnaires may be incomplete, instructions not followed, little variance, missing pages, past cutoff date or respondent not qualified.
- **Editing**: Editing looks to correct illegible, incomplete, inconsistent and ambiguous answers.
- **Coding**: Coding typically assigns alpha or numeric codes to answers that do not already have them so that statistical techniques can be applied.
- **Transcribing**: Transcribing data involves transferring data so as to make it accessible to people or applications for further processing.
- **Cleaning**: Cleaning reviews data for consistencies. Inconsistencies may arise from faulty logic, out of range or extreme values.
- **Statistical adjustments**: Statistical adjustments apply to data that requires weighting and scale transformations.
- **Analysis strategy selection**: Finally, selection of a data analysis strategy is based on earlier work in designing the research project but is finalized after consideration of the characteristics of the data that has been gathered.

Unit V
Interpretation and report writing

Meaning of interpretation

Data interpretation refers to the implementation of processes through which data is reviewed for the purpose of arriving at an informed conclusion. The interpretation of data assigns a meaning to the information analyzed and determines its signification and implications.

Techniques of interpretation

Qualitative Data Interpretation

This is a method that is used to break down or analyze so-called qualitative data, also referred to as categorical data. One important thing to note is that bar graphs or line charts are not used here but rather it relies on text. This is because qualitative data is collected by relying on person-to-person techniques, and thus making it difficult to present using a numerical approach.

The collection of data is done through surveys as you can assign numerical values to answers, which then makes it easier to analyze. If we rely only on the text, which would be an extremely cumbersome process and prone to errors, which is why it needs to be transformed.

Qualitative data can be divided into two main types:

Both of them are interpreted in the same way. However, ordinal data is a lot easier to interpret compared to nominal.

Ordinal data can be labeled with numbers during the process of collection, so you won't have to use complex code in order to perform the analysis. Nominal data takes more time, and it usually requires advanced algorithms that can speed up the interpretation process.

Quantitative Data Interpretation

This interpretation is applied when we are dealing with quantitative or numerical data. Since we are dealing with the numbers, the values can be displayed in a bar chart or pie chart.

Once again, there are two main types:

Discrete

Continuous (this one is further divided into ratio data and interval data). Numbers are easier to analyze since it involves statistical modeling techniques like mean and standard deviation.

Mean

This is an average value of a particular data set which is obtained or calculated by dividing the sum of the values within that data set with the number of values within that same set.

Standard Deviation

This is a technique used to ascertain how responses align with or deviate from the average value or mean. Basically, it relies on the mean to describe the consistency of the replies within a certain data set. You can use this when you are calculating an average pay for a certain profession and then display upper and lower values in the data set.

Precautions in interpretation

1. The interpreter must be objective.
2. The interpreter must understand the problem in its proper perspective.
3. He / she must appreciate the relevance of various elements of the problem.
4. All relevant, adequate and accurate data are collected.
5. Data must be properly classified and analyzed.
6. Find out whether the data are subject to limitations? If so what are they?
7. Watch against the sources of errors.
8. Do not make interpretations that go beyond the information / data.
9. Factual interpretation and personal interpretation should not be confused. They should be kept apart.

Significance of Report in Research

1. **Decision-Making Tool**

   Today's complex business organizations require thousands of information. Reports provide the required information a large number of important decisions in business or any other area are taken on the basis of the information presented in the reports. This is one of the great importances of the report.

2. **Investigation**

   Whenever there is any problem, a committee or commission or study group investigates the problem to find out the reason behind the problem and present the findings with or without the recommendation in the form of a report. It is another importance of the report.

3. **Evaluation**

Large-scale organizations are engaged in multidimensional activities. It is not possible for a single top executive to keep a personal watch on what others are doing. So, the executive depends on reports to evaluate the performance of various departments or units.

4. **Quick Location**

There is no denying the fact that business executives need information for quick decision-making. As top executives are found to be busy for various purposes), they need vital sources of information. Such sources can be business reports.

Different steps in writing report

1. **Logically and chronologically**

Logical treatment often consists in developing the material from the simple possible to the most complex structures. Chronological development is based on a connection or sequence in time or occurrence. The directions for doing or making something usually follow the chronological order.

2. **Preparation of the final outline:** "Outlines are the framework upon which long written works are constructed. They are an aid to the logical organization of the material and a reminder of the points to be stressed in the report."
3. **Preparation of the rough draft:** This follows the logical analysis of the subject and the preparation of the final outline. Such a step is of utmost importance for the researcher now sits to write down what he has done in the context of his research study. He will write down the procedure adopted by him in collecting the material for his study along with various limitations faced by him, the technique of analysis adopted by him, the broad findings and generalizations and the various suggestions he wants to offer regarding the problem concerned.
4. **Rewriting and polishing of the rough draft:** This step happens to be most difficult part of all formal writing. Usually this step requires more time than the writing of the rough draft. The careful revision makes the difference between a mediocre and a good piece of writing. While rewriting and polishing, one should check the report for weaknesses in logical development or presentation. In addition the researcher should give due attention to the fact that in his rough draft he has been consistent or not. He should check the mechanics of writing grammar, spelling and usage.

5. **Preparation of the final bibliography:** The bibliography should be arranged alphabetically and may be divided into two parts; the first part may contain the names of books and pamphlets, and the second part may contain the names of magazine and newspaper articles. Generally, this pattern of bibliography is considered convenient and satisfactory from the point of view of reader, though it is not the only way of presenting bibliography. The entries in bibliography should be made adopting the following order:
6. **Writing the final draft:** The final draft should be written in a concise and objective style and in simple language, avoiding vague expressions. A research report should not be dull, but must enthuse people and maintain interest and must show originality. It must be remembered that every report should be an attempt to solve some intellectual problem and must contribute to the solution of a problem and must add to the knowledge of both the researcher and the reader.

Layout of the research report

The person, who is reading the report, must necessarily be conveyed enough about the study. The layout of the research report should compromise

A. Preliminary Pages
B. Main Text
C. The End matter

Preliminary Pages:

The report should have

- The title with the date
- Acknowledgement in the form of Preface or the Foreword.
- The table of contents (list of tables and illustration)

Main Text:

1. **Introduction:** The purpose of the introduction is to introduce the research topic to the readers. It should clearly indicate the objectives of the research.
2. **Methodology:** The methodology adopted in the study should be carefully explained. The main questions that should be kept in mind while deciding the methodology are; How was the study carried out? What was its basic design?
3. **Analysis of data:** The analysis of data in the form of tables and charts should be properly narrated in the report.

4. **Statements of Findings and Recommendations:** The report must contain the statements of findings and recommendations in the language easily understood by a layman.
5. **Conclusions or Implications of the results:** The researcher should again put down the results of his research clearly and precisely. It is considered a good practice to finish the report with a short conclusion which summarizes and recapitulates the main points of the study.
6. **Summary:** It has become customary to conclude the research report with a brief summary of the report which defines in brief the research problem, the methodology, the major findings and the major conclusions drawn from the research results.

End Matter:

At the end of the report, appendices should be enlisted in respect of all technical data such as questionnaires, mathematical derivations etc. The bibliography should also be given at the end of the report.

Mechanism of Writing a Report

1. Selecting the topic
2. Planning the paper
3. Developing the statement of purpose
4. Gathering the Information
5. Connecting your thoughts
6. Giving credit where credit is due
7. Quoting, Summarizing
8. Citations (Crediting Sources within the paragraph)
9. Editing and Proof reading
10. General guidelines for reference listings

Precautions for writing research report.

- The research report should be long enough to cover the subjects but short enough to maintain the interest.
- The report should not be dull, it should sustain the reader's interest.
- Abstract terminology and technical language should be avoided in a research report.
- The report must provide a readily availability of the findings.
- The layout of the report must be in accordance with the objectives of the research problem.
- The report should be original in nature

- Appendices should be properly listed in all respect in order to avoid any confusions.
- Bibliography of sources of consulted is a must and it should be very carefully and chronologically arranged.
- The report must be attractive in its appearance.
- The 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.
- The limitations related to the study must also be clearly indicated in the research report.