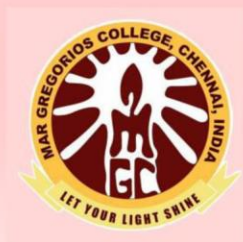# MAR GREGORIOS COLLEGE OF ARTS & SCIENCE

Block No.8, College Road, Mogappair West, Chennai – 37

Affiliated to the University of Madras
Approved by the Government of Tamil Nadu
An ISO 9001:2015 Certified Institution

PG DEPARTMENT OF COMMERCE

SUBJECT NAME: RESEARCH METHODOLOGY

SUBJECT CODE: KDA3A

SEMESTER: III

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Research Methodology syllabus

Objective: To provide knowledge on research methods, techniques and the process and to develop skills in the application of research methods for business problem solving

Unit I Research -Meaning and purpose -types of research -Pure and applied, survey, case study experimental, exploratory -Research Design -Steps in selection and formulation of research problem - steps in research -review of literature

Unit II Formulation of Hypothesis- Types, sources -Testing -sampling techniques- sampling error and sample size

Unit III Methods of data collection -Primary and secondary data -observation -interview -questionnaire - construction of tools for data collection -testing validity and reliability -pilot study and pre-testing

Unit IV Processing and analysis of data -editing -coding -transcription- tabulation -outline of statistical analysis -descriptive statistics -elements of processing through computers -packages for analysis

Unit V Report writing -target audience -types of reports -contents of reports - styles and conventions in reporting -steps in drafting a report

UNIT-1
Research

Meaning of Research:

Research in simple terms refers to search for knowledge. It is a scientific and systematic search for information on a particular topic or issue. It is also known as the art of scientific investigation. Several social scientists have defined research in different ways.

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".

According to Redman and Mory (1923), research is a "systematized effort to gain new knowledge". It is an academic activity and therefore the term should be used in a technical sense.

Purpose / Aims / Objectives of Research

• The main purpose of research is to discover answers to questions through the application of scientific procedures.

• To find out the truth which is hidden and which has not been discovered so far.

• Aims at advancing systematic knowledge and formulating basic theories about the forces

• Research aims to analyse inter-relationships between variables and to derive casual explanation and thus enables us to have a better understanding of the world in which we live.

• Try to improve tools of analysis or to test these against the complex human behaviour and institutions.

• To understand social life and thereby to gain a greater measure of control over social behaviour.

• To provide an educational program in the accumulated knowledge of group dynamics, in skills of research, in techniques of training leaders and in social action.

TYPES OF RESEARCH

• Research can be classified from five perspectives:

1) Application of research study

2) Objectives in undertaking the research

3) Inquiry mode employed

4) Conceptual Research and Empirical research

5) Some Other Types Research

1) Application of research study

There are two broad categories of research:

a) Fundamental or Pure or Basic research - It is a research concerning principles or laws or rules. It aims at the achievement of knowledge and truth. It may verify/testing the old theory and hypotheses or establish a new one. It tries to explain the cause and effect relationship in social phenomena. The knowledge produced through pure research is sought in order to add to the existing body of research methods. It is essentially positive and not normative. This may take the form of the following:

   a. Discovery- where a totally new idea or explanation emerges for¬ empirical research e.g Hawthorne experiments
   b. Invention-where new technique or method is created eg. TQM
   c. Reflection- where a existing theory, technique or group of ideas is¬ re-examined possibly in a different organization or social context. Eg Herberg theory of motivation applied to front-line workers in the contract catering sector?

(b) Applied Research

Applied research is concerned with the solution of particular, problems; for policy formulation, administration and understanding of a phenomenon. It aims at finding a solution for an immediate problem facing a society or an industrial organization. It is an empirical and practical. It is concerned with applied aspects of life. E.g. applied research can be carried out by academic or industrial institutions.

Applied research is designed in solve practical problems of the modern world, rather than to acquire knowledge for knowledge sake. The goal of the applied scientist is to improve the human conditions. For example

   a. Improve agricultural crop production
   b. Treat or cure a specific disease
   c. Improve the energy efficiency of homes, offices, or modes ofϖ transportation

2) Objectives in undertaking the research

Research can be classified as

a) **Descriptive and Analytical Research**- It attempts to describe systematically a situation, problem, phenomenon, service or programme, or provides information about , say, living condition of a community, or describes attitudes towards an issue i.e. It describes the state of affairs as it exists at present. The researcher has no control over the variables. He can only report what has happened or what is happening. Descriptive research includes

- Case Study-Detailed analysis of a single of people or events. The person who is¬ presenting the case usually has some theoretical orientation. It is acceptable for a theoretical orientation to effect one's interpretation of events. The theoretical orientation can also lead to the selection of the facts to include in the case.. Case study therefore assist psychology by illustrating how a theory could be applied to a person or events and by assisting with the development of hypotheses for more systematic testing.
- Survey Research-Structure questions to assess people's beliefs, attitudes and¬ self-reports of behaviour. and fact finding enquiries of different kinds. Such as (1) face –to- face method, (2) phone method and (3) Mail survey
- Observational research-accounts of natural behaviour of individual or group in¬ some setting
- Archival Research/ Analytical research - analysis of pre-existing data or records. One has to use facts or information already available and analyse these to make a critical evaluation of the material. It often involves content analysis

b) **Correlation Research**- attempts to discover or establish the existence of a relationship/ interdependence between two or more aspects of a situation

c) **Explanatory Research**- attempts to clarify why and how there is a relationship between two or more aspects of a situation or phenomenon

d) **Exploratory research**- is undertaken to explore an area where little is known or to investigate the possibilities of undertaking a particular research study (feasibility study or pilot study)

3) Inquiry Mode- two approaches

a) Structured approach/ quantitative research- It involves a collection of numerical data to answer a specific research question. Quantitative research is applicable to phenomena

that are measurable so that they can be expressed in terms of quantity. the research process- objectives, design, sample, and the questions that you plan to ask of respondents- is predetermined the extent of a problem, issue or phenomenon by quantifying the variation. e.g. how many people have a particular problem? How many people hold a particular attitude? It may involves

- Correlation Study-measuring two specific variables and attempting to quantifyϖ the relationship that exists between these variables
- Ex-post Facto- study-the investigator to determine the specific variables forϖ analysis after the research has been completed.
- Longitudinal study- involves choosing a single group of participants andϖ measuring them repeatedly at a selected time intervals to note the changes that occur over time in the specified characteristics for eg. Collecting data with respect to Age and development of children . The investigator identify the specific variable changes through the growth and development.
- Meta-analysis- is used to synthesize the large volume of data describingϖ numerous independent variables and there correlation with reference accuracy.. It is undertaken for the purpose of synthesizing extensive amounts of work on a particular subject.
- Survey- method of collecting standardized information by interviewingϖ representative sample.

(b) Unstructured approach/ qualitative research-

Qualitative research is concerned with qualitative phenomenon. Research designed to find out how people feel or what they think about a particular subject. This approach allows flexibility in all aspects of the research process. It is more appropriate to explore the nature of a problem, issue or phenomenon without quantifying it. Main objective is to describe the variation in a phenomenon, situation or attitude. e.g., description of an observed situation, the historical enumeration of events, an account of different opinions different people have about an issue, description of working condition in a particular industry. Unstructured interview involves- (1) document analysis, (2) particular observation (ethnographic studies), (3) diaries, (4) case study (5) particular observation (6) focus groups.

4) Conceptual Research and Empirical Research

a) Conceptual Research - Conceptual research is that related to some abstract ideas or theory. It is generally used by philosophers and thinkers to develop new concepts or to interpret existing ones.

b) Empirical research- empirical research relies on experience or observation alone. It is data based research coming up with conclusions capable of being verified by observation

or experiment. In empirical research, the researcher has to first set up a hypothesis or guess as to the probable results. He then works out to get enough facts to prove or disprove his hypothesis. It improves knowledge and understanding as well as decision making skill and ability.

5) Some Other Types Research

a) 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.

b) Field setting or laboratory research or simulation research-the research is carried out in field it is called field research or research carried out in laboratory it is laboratory research depending upon the environment in which it is to be carried out.

c) Clinical or diagnostic research- such researches follow case-study methods or in-depth approaches to reach the basic casual 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.

d) One-time research or longitudinal research- research confined to single time period is called one time research. Research carried on over several time-periods is called longitudinal research.

e) Social Research- Social research refers to research conducted by social scientists. It is the scientific investigation conducted in the field of social sciences and also in the behavioural sciences. The research is a systematic method of exploring, analyzing and conceptualizing social life in order to expand, correct or verify knowledge. Social research methods can generally vary along a quantitative/qualitative dimension.

f) Educational Research- is the activity which is directed towards development of a science of behaviour in educational situations. The methods, in which individuals evaluate different aspects of education including: "student learning, teaching methods, teacher training, and classroom dynamics and so on. The findings of educational research need to be interpreted within the context in which they were discovered as they may not be applicable in every time or place.

RESEARCH DESIGN

• A research design is a "Blue Print" for collection, measurement and analysis of data. It is a outlines how the research will be carried out. It provides answers to various questions like -

What techniques will be used to gather data. What kind of sampling will be used? How, time and cost, constraints be dealt with? Etc.

Research Process/ Steps

The research process is similar to undertaking a journey. There are practical steps through which you must pass in your research journey in order to find answers to your research questions.

Steps in Research Process:

1) Selection &Formulation of Research Problem

2) Extensive Literature Review

3) Developing the objectives

4) Indentifying and Labelling Variables

5) Setting Up Of Hypothesis

6) Writing a Primary Synopsis

7) Preparing the Research Design including Sample Design

8) Collecting the Data

9) Processing, Analysis and Interpretation of Data by Statistical Methods

10) Testing of Hypothesis

11) Preparation of the Report or Presentation of Results

1. Selection & formulation of a research problem

Research problem is one which requires a researcher to find out the best solution for the given problem, i.e., to find out by which course of action the objective can be attained optimally in the context of a given environment.

It is the first and most crucial step in the research process is a researcher has to formulate the problem related to his research work. The source of research problems in social sciences revolves around four Ps:

- People- Study of population, a group of individuals, organizations, groups, communities

- Problems- issues, situations, associations, needs, profiles examine the existence of certain issues or problems relating to their lives; to ascertain attitude of a group of people towards an issue
• Programs- content, structure, outcomes, attributes satisfactions, consumers, Service providers, etc to evaluate the effectiveness of an intervention
• Phenomena- cause-and-effect relationships, the study of a phenomenon itself to establish the existence of regularity.

Considerations in selecting a research problem are:

- Interest,
- Magnitude,
- Level of expertise,
- Relevance,
- Availability of data,
- Ethical issues.
- For selecting the correct problem researcher may contact expert, refer library books, discuss with teachers etc. After selecting the correct problem the researcher has to formulate the problem. The Steps in formulation of a research problem are-
- Identify a broad field or subject area of interest to you.
- Dissect the broad area into sub areas.
- Select what is of most interest to you.
- Raise research questions

2. **Extensive Literature Survey**

    Before formulating the research it is desirable that researcher examines all available literature, both conceptual and empirical.
    - The conceptual literature -is one which deals with concepts and theories.
    - Empirical literature is that which contains studies made earlier and so it consists of many facts and figures observed in the earlier studies. The source literature are- books, journals, articles and the like, and
    - Identified the gap of research for future study

3. **Developing the objectives**

    Objectives are the goals you set out to attain in your study. They inform a reader what you want to attain through the study. Each objective should contain only one aspect of the

Study. Objective must contain the main associations and relationships that you seek to discover or establish.

The objectives should start with words such as 'To determine', 'To find out', 'To ascertain','' To describe, ''To measure', 'To explore' etc.,

4. Indentifying and Labelling Variables and measurements scale

• The variables whose change has affected the other variable, is called independent variable. Therefore there is a cause and effect relation between the variables. The research problem must be formulated in such a manner that it highlights the nature, extent and implications of relation existing between the variables. It is only through this process of establishing the effective relation between variables that meaningful conclusions are derived from the study e.g. age, (years/months), gender,(male or female) weight, heights, income, religion etc

5. **Setting Up Of Hypothesis**

 • Hypotheses is a assumption, assertion or an idea about a phenomenon, relationship or situation, the reality or truth of which you do not know. A hypothesis is a tentative conclusion logically drawn. The research work is conducted to test the truth of this hypothesis

6. **Writing a Primary Synopsis**
• After formulating the problems a brief summary of it should be written down on the topic selected for research work mentioning the summary of what is going to be done under his research

7. **Preparing the Research Design**

• Research design is the conceptual structure or blue print within which research would be conducted. The function of research design is to provide for the collection of relevant information with minimal expenditure of effort, time and money. The preparation of research design, appropriate for a particular research problem, involves the consideration of the following :

Method of Data Collection to be adopted-There are two types of data 1) Primary Data— Data collected for the first time &original in nature 2) Secondary Data—those which have already been collected and analysed by someone else Source of secondary data are published source books, journals, records etc

Source of information—Sample Design- A sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given universe. Sample design refers to the technique or the procedure which the researcher would adopt in selecting some sampling/representing/ units from the universe for drawing inferences about the universe.

8. **Collecting the Data**

Instruments/tools/methods used for collecting data are (1)Observation method. (2) Direct personal interview method. (3) Telephone interview method. (4) Questionnaire method. (5) Schedule method. A choice of one of these methods

9. **Processing, Analysis and Interpretation of Data by Statistical Methods**

The processing of data consists of

- Classification and tabulation.-By classification and tabulation the unwieldy data can be condense into few manageable and purposeful groups and tables so that further analysis becomes simple.
- Coding -converts the data into symbols and small figures so that the data can be dealt with in an easy manner.
- Editing -improves the quality of the data since it is at this stage that data which is irrelevant can be dropped.
- Analysis and interpretation of data- results in observation, analysis, conclusion, induction and deduction. For this various statistical measures are computed like

    Descriptive statistics,
    Correlation,
    Regression,
    Ratios etc

10. **Testing of Hypothesis**

• Depending upon the nature of data and conclusions to be arrived one or two of these tests can be applied like
    ANOVA, T-test, F-test, Chi Square test etc.
Testing of hypothesis will results in either accepting or rejecting the hypothesis. Testing of hypothesis will result in contribution to existing theory or the generation of a new theory

11. Preparation of the Report or Presentation of Results/thesis

• A report is a detailed description of what has been done and how it has been done with respect to a particular area or topic. The report should contain the preliminary section, the main body and the end matter. The preliminary section contains only titles, data, acknowledgement foreword and table of contents. The important section of a report is its main body. It carries introduction, methodology, and statements of findings, conclusions and recommendations. The end matter includes appendix, literature selected and bibliography. The appendix includes letters, questions or other tools used. Bibliography is the list of books, journals. Reports, bulletins etc. used for reference.

Review of literature

Review of literature pertaining to the current field of investigation mainly aims at critically reviewing and re-examining the earlier conceptual and empirical studies, the major methodological limitation, and direction for further research highlighted by the previous research with a view to identifying and defining the 'research gap' to be addressed by the current research study.

UNIT -2
Formulation of Hypothesis

Formulation of Hypothesis

Formulation of hypothesis, however, requires that the difficulties encountered are overcome. A researcher may suffer from a number of difficulties at the stage of formulating a good hypothesis

- The researcher should have a thorough knowledge of the accepted theories and basic concepts of that research area where he has decided to work in.

- The researcher should also acquire the logical and scientific thinking power to frame a hypothesis based on the theories and basic concepts known to him.

- The researcher should also be well acquainted with the available research methods and techniques.

Normally, the hypothesis made in the beginning of research is of crude or working nature. Such a working hypothesis is to be made while planning a research work. As the research work proceeds

with the working hypothesis, new information, data and evidence becomes available. In the light of new information and evidence, the working hypothesis is to be modified and revised.

Types of Hypothesis

There are six forms of hypothesis and they are:

- Simple hypothesis
- Complex hypothesis
- Directional hypothesis
- Non-directional hypothesis
- Null hypothesis
- Associative and casual hypothesis

Simple Hypothesis

It shows a relationship between one dependent variable and a single independent variable. For example – If you eat more vegetables, you will lose weight faster. Here, eating more vegetables is an independent variable, while losing weight is the dependent variable.

Complex Hypothesis

It shows the relationship between two or more dependent variables and two or more independent variables. Eating more vegetables and fruits leads to weight loss, glowing skin, reduces the risk of many diseases such as heart disease, high blood pressure and some cancers.

Directional Hypothesis

It shows how a researcher is intellectual and committed to a particular outcome. The relationship between the variables can also predict its nature. For example- children aged four years eating proper food over a five-year period are having higher IQ levels than children not having a proper meal. This shows the effect and direction of effect.

Non-directional Hypothesis

It is used when there is no theory involved. It is a statement that a relationship exists between two variables, without predicting the exact nature (direction) of the relationship.

Null Hypothesis

It provides the statement which is contrary to the hypothesis. It's a negative statement, and there is no relationship between independent and dependent variables. The symbol is denoted by "HO".

Associative and Causal Hypothesis

Associative hypothesis occurs when there is a change in one variable resulting in a change in the other variable. Whereas, causal hypothesis proposes a cause and effect interaction between two or more variables.

Sources of Hypothesis

Following are the sources of hypothesis:

- The resemblance between the phenomenon.
- Observations from past studies, present-day experiences and from the competitors.
- Scientific theories.
- General patterns that influence the thinking process of people.

Testing of Hypothesis

As stated in the beginning, the hypothesis formulation marks the beginning of any research. After the hypothesis is formulated in the context of a research problem, next process involves a collection of relevant data and information and analysis of the same using an appropriate statistical technique, which proves or disproves the hypothesis formulated in the beginning.

The testing of hypothesis thus represents the end of the research work. Testing of hypothesis can be considered as the most important step in any type of research work as it determines the fruitfulness of the research work.

The exercise of hypothesis testing is a systematic work and normally involves following stages or steps:

1. Stating the hypothesis of interest
2. Collection of relevant data and information
3. Formation of null hypothesis
4. Alternative Hypothesis
5. Selection of suitable test statistic
6. Determine the level of significance
7. Decision

Stating the hypothesis of interest

Based on the research problem and a primitive understanding of the relationship between the variables involved, a researcher formulates a hypothesis of interest or a research hypothesis which he wants to prove.

Collection of relevant data and information

Given the research problem and the formulated hypothesis of interest, the next step is to collect the relevant data and information to proceed further towards the end objective (i.e. proving the research hypothesis).

Formation of null hypothesis

For the testing purpose, a null hypothesis is formed based on the statistical data. The null hypothesis is also called as the hypothesis with no difference.

In other words, null hypothesis states that there is no difference between the variables involved in the hypothesis or the variables are not related.

For example, if the research hypothesis is that the commerce graduates are more employable than the arts graduates, then the null hypothesis will be that both are equally employable or that there is no difference in the employment opportunities available to both.

Alternative Hypothesis

After the formulation of null hypothesis, alternative hypothesis can be derived. Alternative hypothesis is the negation of null hypothesis and can be more than one and conform to the research hypothesis.

In the example of employability, the alternative hypothesis can be

- **Two-sided**
  o commerce graduates are more employable or arts graduates are more employable
- **One-sided**
  o commerce graduates are having more employability
  o arts graduates are having more employability.

Selection of suitable test statistic

The next step in the hypothesis testing exercise is that of selecting an appropriate statistical test. It can be chi-square test, t-test or f-test or any other test. Such a test is carried out at a given level of significance.

Determine the level of significance

As stated in the above step a statistical test is conducted at a given level of significance

- A level of significance indicates the probability of rejecting or accepting the null hypothesis.

Decision

The last step in testing hypothesis is that of taking a decision on the basis of the given level of significance

- It is seen whether the null hypothesis falls in the accepting region or in rejecting region and accordingly a decision is taken. In this way, the acceptance or rejection of null hypothesis determines the acceptance or rejection of the initial research hypothesis.

Sampling

Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a larger population. The methodology used to sample from a larger population depends on the type of analysis being performed, but it may include simple random sampling or systematic sampling.

Sampling Techniques

There are lot of sampling techniques which are grouped into two categories as

- Probability Sampling

- Non- Probability Sampling

1. **Probability sampling:** Probability sampling is a sampling technique where a researcher sets a selection of a few criteria and chooses members of a population randomly. All the members have an equal opportunity to be a part of the sample with this selection parameter.

2. **Non-probability sampling:** In Non-probability sampling, the researcher chooses members for research at random. This sampling method is not a fixed or predefined selection process. This makes it difficult for all elements of a population to have equal opportunities to be included in a sample.

In this blog, we discuss the various probability and non-probability sampling methods that you can implement in any market research study.

Probability Sampling

This Sampling technique uses randomization to make sure that every element of the population gets an equal chance to be part of the selected sample. It's alternatively known as random sampling.

1. Simple Random Sampling
2. Systematic Sampling
3. Stratified Sampling
4. Clustered Sampling

Now let us discuss its types one by one here.

Simple random sampling

In this sampling method, each item in the population has an equal and likely possibility of getting selected in the sample (for example, each member in a group is marked with a specific number). Since the selection of item completely depends on the possibility, therefore this method is called "**Method of chance Selection**". Also, the sample size is large, and the item is selected randomly.

Systematic Random Sampling

In this method, the items are chosen from the destination population by choosing the random selecting point and picking the other methods after a fixed sample period. It is equal to the ratio of the total population size and the required population size.

Stratified Random Sampling

In this sampling method, a population is divided into subgroups to obtain a simple random sample from each group and complete the sampling process (for example, number of girls in a class of 50 strength). These small groups are called **strata**. The small group is created based on a few features in the population.

Clustered Sampling

Cluster sampling is similar to stratified sampling, besides the population is divided into a large number of subgroups (for example, hundreds of thousands of strata or subgroups). After that, some of these subgroups are chosen at random and simple random samples are then gathered within these subgroups. These subgroups are known as **clusters**. It is basically utilised to lessen the cost of data compilation.

Non-Probability Sampling

It does not rely on randomization. This technique is more reliant on the researcher's ability to select elements for a sample. Outcome of sampling might be biased and makes difficult for all the elements of population to be part of the sample equally. This type of sampling is also known as non-random sampling.

Convenience Sampling

Here the samples are selected based on the availability. This method is used when the availability of sample is rare and also costly. So based on the convenience samples are selected.

Purposive Sampling

This is based on the intention or the purpose of study. Only those elements will be selected from the population which suits the best for the purpose of our study.

Quota Sampling

This type of sampling depends of some pre-set standard. It selects the representative sample from the population. Proportion of characteristics/ trait in sample should be same as population. Elements are selected until exact proportions of certain types of data is obtained or sufficient data in different categories is collected.

Referral /Snowball Sampling

This technique is used in the situations where the population is completely unknown and rare. Therefore we will take the help from the first element which we select for the population and ask him to recommend other elements who will fit the description of the sample needed. So this referral technique goes on, increasing the size of population like a snowball.

Sampling error

Sampling error can be measured in different ways, but in reality, the error obtained is almost always an estimate of the actual error rather than the absolute measure of the error. To calculate any true population, first, we have to calculate the sample value.

Sampling Error Definition

Sampling error is defined as the amount of inaccuracy in estimating some value, which occurs due to considering a small section of the population, called the sample, instead of the

whole population. It is also called an error. Sample surveys take into account the study of a tiny segment of a population, so, there is always a particular amount of inaccuracy in the information obtained. This inaccuracy can be defined as error variance or sampling error.

Sampling Error Formula

The measure of the sampling error can be calculated for particular sample size and design. This measure is termed as the correctness of the sampling plan. Sampling error is also due to the concept called sampling bias. This error is considered a systematic error.

The formula to find the sampling error is given as follows:

If N is the sample size and SE is the sampling error, then

Sampling Error, S. E = $(1/\sqrt{N})$ 100

Sampling errors are of two types:

Biased Errors:

The errors that occur due to a bias of prejudice on the part of the informant or enumerator in selecting, estimating measuring instruments are called biased errors. Suppose for example, the enumerator uses the deliberate sampling method in the place of simple random sampling method, then it is called biased errors. These errors are cumulative in nature and increase when the sample size also increases. These errors arise due to defect in the methods of collection of data, defect in the method of organization of data and defect in the method of analysis of data.

Unbiased Errors:

Errors which occur in the normal course of investigation or enumeration on account of chance are called unbiased errors. They may arise accidentally without any bias or prejudice. These errors occur due to faulty planning of statistical investigation.

Sample size

The **sample size** is the measure of the number of individual samples used in an experiment. For example, if we are testing 50 samples of people who watch TV in a city, then the sample size is 50. We can also term it sample statistics.

Statistics is the study of the process of collecting, organizing, analyzing, summarizing data and drawing inferences from the data so worked on. In Statistics, we come across two types of data –

- **Population data**
- **Sample data**

Population data is a large amount of data that includes the whole area of study, which is termed as population. A population consists of all the elements that are studied for the research.

On the other hand, sample data is a part of the population. Usually, it is quite clumsy and difficult to compute the whole population. In this case, a representative sample is selected from the population. This sample is termed sample data. In this article, let us discuss the sample size definition, formulas, examples in detail.

Sample Size Definition

The sample size is defined as the number of observations used for determining the estimations of a given population. The size of the sample has been drawn from the population. Sampling is the process of selection of a subset of individuals from the population to estimate the characteristics of the whole population. The number of entities in a subset of a population is selected for analysis.

Small Sample Size

Sometimes the sample size can be very small. When the sample size is small ($n < 30$), we use the t distribution in place of the normal distribution. If the population variance is unknown and the sample size is small, then we use the t statistic to test the null hypothesis with both one-tailed and two-tailed, where $t = \bar{X} - \mu/s/\text{square root of } n$

Large Sample Size

Generate for more accurate estimates but large sample size might cause difficulties in interpreting the usual tests of significance, and the same problem may arise in case of very small sample size. Thus, neither too large nor too small sample sizes help research projects.

> **UNIT-3**
> **Methods of data collection**

Data:

Data are facts, figures and other relevant materials past and present serving as basis for study and analysis.

Methods of data:

There are two types of data

    a. **Primary data-**

        Primary data are those data which are collected for the first time and these are in original in character. This data are also called first hand information

    b. Secondary data-

    Secondary data are those which have already been collected and used by some other persons. They are usually in the shape of finished products. They are called secondary information

Methods of Collecting Primary Data

1) Observation 2) Survey method 3) Interview 4) Experimentation 5) Simulation 6) Questionnaire- (i) Mail survey (ii) Schedule 7) Use of telephone 8) Panel method 9) Projective technique 10) Content analysis

1. Observation

Meaning:

    Observation is the systematic viewing/watching of specific phenomenon or investigator's own direct observation of relevant people, actions and situations without asking from the respondent for gathering primary data for a particular study Example: Watching the life of street-children provides a detailed description of their social life.

Features of observation

– Physical & mental activity-direct contact with the environment. – Selective-Specific purpose of noting things relevant to the study – Purposive & not informal – Grasps the significant events & occurrences – Should be exact & based on standardized tools of research

Advantages& Limitations

    • **Advantages of observation method** 1) observing the behavior in a normal setting 2) Actual or habits of person are observed 3) Obtain information from those who are unable to effectively communicate in written or oral form 4) No better way to gather information than through observation 5) Most reliable method of data collection

    • **Limitations** 1) Feelings, beliefs and attitudes that motivate buying behavior and infrequent behavior cannot be observed. 2) Expensive method 3) Options and attitudes cannot be obtained by observation.

2. Survey method (Scheduling)

    • **Meaning**-Survey research also called field research, the investigator/interviewer gathering first hand information by using formal lists of questions asked of all respondents in the same way. This method is suited for gathering descriptive information.

    • **Approaches**- – Direct Approach: The researcher asks direct questions about behaviours and thoughts. E.g. why don't you eat at MacDonald's? – Indirect Approach: The researcher might ask: "What kind of people eat at MacDonald's?"

• **Advantages** – collect many different kinds of information – Quick and low cost as compared to observation and experimental method

• **Limitations** – Respondent's reluctance to answer questions asked by unknown interviewers about things they consider private – Busy people may not want to take the time – unable to answer because they cannot remember.

3. Interview

• **Meaning**- interview is a two-way systematic conversation between an investigator and an informant, initiated for obtaining information relevant to a specific study. Interviewing requires face to face contact or over telephone.

• **Types of interviews**

1) Structured Interviews-involve the use of a set of pre-determined questions and of highly standardized techniques of recording, interviewer follows a rigid procedure laid down asking questions in a form and order prescribed. (used in descriptive studies)

2) Unstructured interviews- flexibility of approach to questioning-do not follows a system of pre-determined questions and standardized techniques of recording information the interviewer is allowed much greater freedom to ask, he may even change the sequence of questions. (used in exploratory studies)

3) Focused group Interview- is a tool to understand people's thoughts, experience and feelings, about a product, service or organization. Comments are recorded through note taking or videotaped

4) Clinical/Depth Interview - it is concerned with broad underlying feelings, opinion, emotions or motivations or with the course of individual's life experience about a product, service or organization on the basis on interview guide.

5) Direct interviews/Interview Schedule –it is a set questionnaire, when the researchers asks the questions and records the respondent's reply on the interview schedule.

6) Non-direct Interview- Interviewer encourage the respondent to talk about the given topic with a base minimum of direct questioning for the purpose eliciting the respondents feeling and beliefs on the given topic.

7) Telephone- quick method of collecting information contacting respondents on telephone. In this process interviewer can explain questions not understood by the respondent.

8) Personal Interviewing- Personal interview can be used in any type of questionnaire and can be conducted fairly quickly. Interviewers can also show actual products, advertisements, packages and observe and record their reactions and behavior.

• **Merits of interview method**a) More information can be obtained b) Greater flexibility c) Observation method can be applied d) Group discussions may also be used e) Supplementary information can collect

• **De-merits of interview method** a) Very expensive b) More time consuming c) Basis of interviewer and interviewee.

4. Experimental Method-

• **Also called Empirical Research or Cause and Effect Method;** it is a data-based research, coming up with conclusions which are capable of being verified with observation or experiment. Such research is characterised by the experimenter's control over the variables under study and the deliberate manipulation of one of them to study its effects. Researcher must provide working hypothesis. Then work to get enough facts (data) to prove or disprove the hypothesis.

• **Types**- – Laboratory experiments- is an investigation conducted in situation created specifically for that purpose – Field experiments-This is an experiment conducted in real life situation in which the experiments manipulate an independent variable in order to test a hypothesis.

5. Simulation

• **Meaning**- It is a realistic enactment of roles in an imagined situation. There are three uses; – Assessment of a situation, – understanding a situation and – Decision making in a situation

• **Types of Simulation** – Computer simulation – Man simulation – Man computer simulation

6. Questionnaire

• **Questionnaire** is a document containing a list of questions presented to a respondent for answers. • Mail- questionnaire sent by post to respondents with covering letter or note introduce you; explain the purpose of doing research and requesting to send filled questionnaire within in reasonable time to the researchers. The respondents read the questions, interpret what is expected and then write down the answers themselves.

• **Advantage** – It can be used to collect large amounts of information at a low cost – respondents may give more honest answers to questions – Convenient for respondent's who can answer when they have time.

Characteristics of a good questionnaire/ guidelines

• There are no hard and fast rules, only guidelines can be provided in developing a questionnaire

– Questions should be a simple and there should be no abbreviation – Maximum clarity should be maintained – Sequences of questions should be maintained – Questions should be an elegant appearance – It should attract the attention and generate interest of the informant. – The reliability and validity of the questions asked to be maintained – Question should contain polite, scope and coverage – Questions should be pre-testing.

Type of Questionnaire

1) Closed –ended Questionnaire: Closed ended questions include all possible answers/prewritten response categories, and respondents are asked to choose among them. E.g. multiple choice questions, scale questions e. g. how many people use a service?

2) Open-ended Questionnaire: Open-ended questions allow respondents to answer in their own words. Questionnaire does not contain boxes to tick but leaves a blank section for the response to write in an answer e.g. what people think about a service

3) Combination of both: Begins with a series of closed –ended questions, with boxes to tick or scales to rank, and then finish with a section of open-ended questions or more detailed response.

4) Dichotomous Questions- It has only two response alternatives: E.g Yes or no, agree or disagree, and so on

5) Contingency Question: A survey question is intended for only some respondents determined by their responses to some other questions E.g. do you smoke cigarette?– Yes/ No If yes, how many cigarettes you smoke per day?

Pilot Study & pre-test

• **A PILOT STUDY**: is the process of carrying out a preliminary study, going through the entire research procedure with a small sample before a large scale filed study is termed as pilot survey

• **A PRE-TEST**:

Usually refers to a small-scale trial of particular research components. i.e. where a questionnaire is tested on a (statistically) small sample of respondents, in order to identify any problems such as unclear wording or the questionnaire taking too long to administer

• **Uses of Pilot Study**

– To pre-test the suitability of questions – To generate fixed choice answers – To avoid unforeseen problems during the large survey – To provide experience and confidence to the interviewer.

Collection of Secondary Data

Secondary data are those which have already been collected and used by some other persons. They are usually in the shape of finished products. They are called secondary information.

• **Advantages of Secondary data** – Less cost: The information can be collected by incurring least cost. – Less time consuming: The time requires for obtaining the information is very less – Large quantity of information: Most of the secondary data are those published by big institutions. So they contain large quantity of information

• **Disadvantages of Secondary data**- – Since the secondary data is a result of some other person's attempt, it need not be suitable for a researcher, who makes use of it – It may be inaccurate and unreliable. – It may contain certain errors.

Precautions to be taken before Using Secondary Data & Sources of Secondary Data

Precautions

– **Suitability**: - The investigator should satisfy him that the data available are suitable for the enquiry on hand. – Adequacy: - the adequacy of the data should be tested by studying the items covered by the original enquiry and the items to be covered by the enquiry.

– **Reliability**:- The reliability of secondary data should be tested

Sources of Secondary Data

-There are varieties of published sources from which one can get information for his research work. The important such sources are; – Official report of the central, state and local government. – Official publications of the foreign governments and international bodies like UNO and its subordinate bodies. – Reports and publications of Trade Associations, Banks, Cooperative Societies and Similar Semi Government and Autonomous Organizations. – Technical journals, News papers, Books, Periodicals, etc – Publications of research Organizations, Centers, Institutes, and reports submitted by Economists, Research scholars etc.

Difference between Primary data and Secondary data

Primary data Secondary Data 1 Primary data is Original in character Secondary data is not original 2 Collection of data is expensive Collection of secondary data is less expensive 3 Primary data is in the shape of raw materials Secondary data is the shape of finished products 4 Primary data is adequate and suitable Secondary data need not be ample and apposite 5 It is original collected by the investigator It is available in available source.

Case Study

• **Case study** is a method of exploring and analyzing the life of a social unit. The social unit may be a person or a family or an institution or an organization or even a community. It is a method of collecting information and its analysis. It is a way of organizing social data so as to preserve the unitary character of the social object, being studied.

• **Sources of Case Study**

The sources from which information are collected in a case study are;

1) Personal documents-They contain the description of the remarkable events of the life of the narrator as well as his reactions towards them. Therefore from these personal documents, one can study the writer's personality, social relationship and philosophy of life.

2) Life history-Through interviews with a respondent, his life history can be known. This is an objective study in which various events of respondent's life are studied with an attempt to find their significance for the society.

Phases of Case Study

• The researcher has to select the problem had to study the problem.

• The researcher ha to describe the course of events. • Materials about each of the units or aspects are collected.

• There are certain factors which are responsible for every event. They must be identified and studied.

• The role of the factors responsible for the events is analyzed and conclusions are drawn about the effect of the factors.

Test reliability

Reliability refers to how dependably or consistently a test measures a characteristic. If a person takes the test again, will he or she get a similar test score, or a much different score? A test that yields similar scores for a person who repeats the test is said to measure a characteristic reliably.

Test validity

Validity is the most important issue in selecting a test. Validity refers to what characteristic the test measures and how well the test measures that characteristic.

- Validity tells you if the characteristic being measured by a test is related to job qualifications and requirements.
- Validity gives meaning to the test scores. Validity evidence indicates that there is linkage between test performance and job performance. It can tell you what you may conclude or predict about someone from his or her score on the test. If a test has been demonstrated to be a valid predictor of performance on a specific job, you can conclude that persons scoring high on the test are more likely to perform well on the job than persons who score low on the test, all else being equal.
- Validity also describes the degree to which you can make specific conclusions or predictions about people based on their test scores. In other words, it indicates the usefulness of the test.

TECHNIQUE FOR COLLECTION OF DATA

• Census: Data collected from each and every unit of population is called census method

• Sampling- A few units in the universe or a segment of the population selected to represent the population as a whole. i.e. instead of studying each and every unit of population

only a few (part) unit of population (universe) are studied and conclusion is drawn for entire population is called sampling. Two advantages of sampling are that the cost is lower and data collection is faster.

• A Sample design -is a definite plan for obtaining a sample from a given population

• Sample Unit-Unit in relation to which data are collected. E.g. (a) Geographical-state, district, village etc. (b) Construction unitHouse, flat etc (c) Social unit- family, club, school or individual.

• Sample size- the number of items to be selected from the universe to constitute a sample. It is denoted by (n).

Attitude measurement techniques

• Attitude measurement techniques- the qualitative variable/information like knowledge, performance, character (feelings, attitude, opinions) etc. must be converted into numerical form for further analysis. This is possible through measurement and scale techniques.

• Measurement: - the process of observing and recording the observations that are collected as part of research. The recording of observations may be in the form of numbers or symbols are called measurement.

• Scaling: - is the assignment of objects to numbers according to rule. In scaling the objects are text statements, usually statement of attitude, opinion or feeling.

Socio-metry

• A technique for analyzing/quantitative measuring the pattern of relationships among group members- especially hierarchies, friendship networks and cliques. It enables the researcher to get a comprehensive picture structure of social relationship.

Check list

• Checklists are the documents/planned list used to verify that a number of specific lines of inquiry, steps, methods ,tools and technique to be follow or actions are being taken, or have been taken etc , by a researcher during the course of research. It helps the researcher to ensure consistency and completeness in carrying out a research work.

UNIT-4
Processing and analysis of data

• DATA PROCESSIING

Processing data involves a number of closely related operations which are performed with the purpose of summarizing the collected data and organizing these in a manner that they answer the research questions (objectives)

• Processing stages/operations-There are four important stages in the processing of data. They are;

• Editing

• Coding

• Classification

• Tabulation

Editing

Editing- a process of examining the collected raw data to detect errors and omissions and to correct these when possible

• Practical guidelines for editing- While editing care has to be taken to see that the data are as accurate and complete as possible. The following points are to be noted;

– The editor should familiarize with the copy of instructions given to the interviewers. – The original entry, if found incorrect, should not be destroyed or erased. On the other hand it should be crossed out in such a manner that it is still eligible – Any, modification to the original entry by the editor must be specifically indicated – All completed schedules must bear signature of the editor and the date – Incorrect answer to the questions can be corrected only if the editor is absolutely sure of the answer, otherwise leave it as such. – Inconsistent, incomplete or missing answers should not be used.

• Sure that all numerical answers are converted to same unit.

Coding & Classification

Coding- This process of assigning numerals or symbols to the responses is called coding; It facilitates efficient analysis of the collected data and helps in reducing several replies to a small number of classes.

Classification-a process of arranging data in groups or classes on the basis of common characteristics depending on the nature of phenomenon involved.

Types of classification

A. Classification according to external characteristics- this classification, data may be classified either on geographical basis or periodical basis

- Classifications on geographical basis-In this type of classification, the data that are collected from different places are placed in different classes.

- Classification on periodical basis (chronological classification)-In this type of classification, the data belonging to a particular time or period are put under one class. This type of classification is based on period.

B. Classification according to internal characteristics

- Classification according to internal characteristics-Data may be classified either according to attributes or according to the magnitude of variables

- Classification according to Attributes-In this type data are classified on the basis of common characteristic. E.g descriptive such as literacy, sex, religion etc. or numerical such as weight, height, income etc

- Simple Classification-If the classification is based on one particular attribute only it is called simple classification.

- Manifold Classification-If the classification is based on more than one or several attribute it is called manifold or multiple classifications, in this data are classified in several groups.

C. Classification According Variable

- Classification according variables- Here the data are classified to some characteristics that can be measured. Data are classified on the basis of quantitative characteristics such as age, height; weight etc.

- Quantitative variables are grouped in to two –

  a) Discrete variable- the variables can take only exact value, it is called discrete variable.

  b) Continuous variables-the variables that can take any numerical value within a specified range are called continuous variable.

Tabulation

Tabulation-It is an orderly arrangement of data in rows and columns. It is defined as the "Measurement of data in columns and rows. It is a stage between classification of data and final analysis.

Objectives of Tabulation

– To clarify the purpose of enquiry

– To make the significance of data clear

– To express the data in least possible space

– To enable comparative study

– To eliminate unnecessary data

– To help in further analysis of the data

Tabulation may also be classified as simple and complex tabulation.

• Simple tabulation: generally results in one-way tables which supply answers to questions about one characteristic of data only.

• Complex tabulation: usually results on two-way tables (which give information about two inter-related characteristics of data), three –way tables or still higher order tables, also known as manifold tables.

Parts of a statistical table

• Title of the table

• Caption or title of the column-It is also termed as "box head". There may be sub-captions under the main caption.

• Stub (row heading)-Stub refers to the title given to rows

• Body (main data)-This is the main body of information needed for the research work.

• End note (foot note)-This is placed below the table to convey the expansions of abbreviations to caption, stub or main body.

• Source note-If the table is based on outside information, it should be mentioned in the source note below.

Descriptive Techniques

• Common Descriptive Techniques-The most common descriptive statistics used in research consist of percentages and frequency tables

• Percentages-Percentages are a popular method of displaying distribution. Percentages are the most powerful in making comparisons. In percentages, we simplify the data by reducing all numbers in a range of 10 to 100.

• Frequency Tables-One of the most common ways to describe a single variable is with a frequency distribution. Frequency distribution can be depicted in two ways, as table or as a graph. If the frequency distribution is depicted in the form of a table, we call it frequency table. If the frequency distribution is depicted in the form of a graph like histogram, cumulative (ogive) etc, we call it frequency graph.

• Contingency Tables-A Contingency table shows the relationship between two variables in tabular form. The term Contingency table was first used by the statistician Karl Pearson in 1904. Contingency tables are especially used in Chi- square test.

Graphs and Diagrams

Graphs and Diagrams- is one of the methods presenting data in which simplifies the complexity of quantitative data and make them easily intelligible.

Uses of Graphs and Diagrams

– They help in presenting quantitative facts in simple, clear and effective pictures.

– They make the whole data readily intelligible. – They can be used for comparison purpose.

– They are useful in analyzing complex economic theories. – They save much time in understanding data.

– Facts can be understood without doing mathematical calculations. – They help in locating statistical measures such as median. Quartile, mode etc.

Types of Graphs

• **Types of Graphs**- The following graphs are commonly used to represent data – Charts or line graphs – Bar charts – Circle charts or pie diagram – Pictograms

Processing in computer

Data processing, manipulation of data by a computer. It includes the conversion of raw data to machine-readable form, flow of data through the CPU and memory to output devices, and formatting or transformation of output. Any use of computers to perform defined operations on data can be included under data processing.

Elements of a Computer System

There are six main elements that make up a computer system. They all interact with each other and perform the task at hand. Let us take a look at all of them.

1] Hardware

These are all the physical aspects of a computer system. They are tangible, i.e. you can see and touch them. Hardware components are the electronic or mechanical instruments, like keyboard, monitor, printer etc. They help the users interface with the software, and also display the result of the tasks being performed.

2] Software

Software is nothing but a set of programmes (computer instructions), which helps the user to do a set of specific tasks. It helps the user interact with the computer system with the help of hardware. Software, as you can imagine, is the intangible aspect of the computer system.

3] People

The people interacting with the computer system are also an element of it. We call this element the Liveware. They are the ultimate "users" of the computer systems.

4] Procedures

These are a set of instructions, written in code, to instruct a computer on how to perform a task, run a software, do calculations etc. There are three types of procedures in a computer They are,

- Hardware-Oriented Procedure: Instructs the hardware components of the system, ensures they work smoothly

- Software Oriented Procedure: Provides instructions to launch and run software programs

- Internal Procedures: Directs the flow of information and sequences the data.

5] Data

Data is essentially the raw facts and figures that we input in the computer. The data gets processed via the computer system and becomes information, which is processed and organized data. Information can then be used for decision-making purposes.

6] Connectivity

This is when the computers are linked to a network. It facilitates sharing of information, files, and other facilities. Computers can connect to a network via LAN cables, Bluetooth, Wi-Fi, satellites etc. The internet is the most obvious example of connectivity in a computer system.

Packages for analysis

Interactive Data Language (IDL), from Research Systems, Incorporated, is a package used to analyze scientific data, and plot or display results. The package includes an interpreted programming language and commands which can be interactively typed from the keyboard or executed or combined with other programs.

Uses of statistical packages

Sophisticated statistical packages such as Statgraphics, SPSS, and SAS provide programs to analyze a variety of statistical models. Also, the commonly used Microsoft Excel package includes modules for some routine statistical models such as descriptive statistics and regression analysis.

SPSS is short for Statistical Package for the Social Sciences, and it's **used** by various kinds of researchers for complex statistical data analysis. ... Most top research agencies use **SPSS** to analyze survey data and mine text data so that they can get the most out of their research projects.

UNIT-5
Report writing

Report – Writing

Meaning: A research report is the formal statement of the research process and its results. It is the end product of a research activity, it narrates the problems studied, methods used for studying and the findings and conclusions of the study. The purpose of research report is to informs the world what you have done, what you have discovered and what conclusions you have drawn from your findings. The report should be written in an academic style. Language should be formal and not journalistic.

Characteristics of the Report:

– Research report is a narrative but not authoritative document
 – It is non-persuasive as form of communication
– It is simple readable and accurate form of communication

Target Audience:

A target audience is a group of people that share similar needs and interests that a business aims to serve. These people are the end-users in most cases.

Types of the Target Audience:

The main obstacle on the way to select the proper segment is to target is the number of factors you should consider. You may ignore some of them, but the results will be less accurate. If you wish to reach maximum profitability and cost efficiency in the shortest period, consider the following criteria:

- **Demographic information.** It provides businesses with an essential user background, in particular, age, gender, marital status, race, religion, ethnicity, income. It doesn't require an in-depth analysis, so this data is easy to collect.

- **Geographic information.** It means user location. This kind of data is especially important since it provides local businesses with more opportunities. For example, a company that offers surfing equipment may exclude nordic countries while creating an ad campaign and focus their efforts on the South to break down the budget wisely.

- **Psychographic information.** This piece of data includes users' traits, lifestyle, social class, beliefs, interests and preferences, hobbies. That is a chance to dig deeper and know your audience better. You may get this information from a customer preference center, ask via email, or analyze their behavior on your website.

Types of Report

a) Technical Report- is used in industry to communicate technical information. These reports help businesses make decisions, for example, in selecting and purchasing equipment, or finding solutions to technical problems. Engineering and applied sciences subjects often set assignment tasks that require technical report writing. E.g. solve a design problem; investigate and evaluate the solutions to an environmental problem; develop a program or an information management plan for a specific issue or company.

b) Business reports- are practical learning tasks where you apply the theories you have been studying to real world (or realistic) situations. Reporting financial information, marketing and management strategies and issues to others is an important component of business studies.

c) Abstract or Executive Summary - An abstract is a brief summary of a research article, thesis review, conference proceeding. The whole traditional report divisions: objective, method, discussion, conclusions in a concise paragraph of about 200-300 words. It emphasizes the objective and the analysis of the results in a precise and specific summary. It is submitted before submitting full article or thesis. d) Interim report- In research, the research timing is long; an interim report is often compiled to analyze how the research work is proceeding, before its final completion. e) Research article- this is designed for publication in a professional journal. A research article must be clearly written in concise and lucid language. It must be logically organized progressing from statement of problem and the purpose of the study, through analysis and evidence, to the conclusions and implications.

d) Interim report- In research, the research timing is long; an interim report is often compiled to analyze how the research work is proceeding, before its final completion.

e)   Research article- this is designed for publication in a professional journal. A research article must be clearly written in concise and lucid language. It must be logically organized progressing from statement of problem and the purpose of the study, through analysis and evidence, to the conclusions and implications.

Planning/Steps in Report Writing

1.   Plan the project in advance; fix the target and final date of completing the report
2.   The time of report writing should be planned in advance.
3.   Arrange the data, documents, bibliography etc. in conformity with the structure of the report.
4.   The outline should be based on all main points and sub points.
5.   Prepare a rough report of what one has done in his studies. He has to write down the procedure adopted by him in collecting the material, the technique or analysis adopted by him, the broad findings and generalizations and his suggestions.
6.   Revising the rough report-Keep the rough report for few days for careful reading and then revising it on the basis of thinking and discussing with others. It is an appropriate to get help of some experienced and knowledgeable person at this stage.
7.   Rewrite the report on the basis of the revision made and corrections effected on the report.
8.   Prepare final bibliography. Bibliography may contain two parts, first containing name of the books and pamphlets, second containing the names of magazines/ journals and newspaper articles and web link
9.   Last step is writing of a final draft of the report. The final draft should be written in a concise and objective style and in simple language

Style/Parts/Components of a Research Report.

1) Prefatory Items 2) Chapter Part 3) Bibliography-Reference of books or Journals etc 4) Appendices-questionnaires, working papers, Co. B/ sheet

1) Prefatory Items • Title Page • Researcher's Declaration • Certificate of the Research/Supervisor's Guide • College Certificate • Acknowledgements • Contents • List of Abbreviations • List of Tables • List of Figures/Charts • List of Appendices/Appendixes.

2) Chapter Part • Chapter- 1 Introduction- explanation about the topic selected • Chapter-2 Research design

a) Statement of the Research Problem

b) Significance of the Study

c) Review of Previous Studies/Literature

d) Scope and Area of the Study/Research gap

e) Objectives of the Study

 f) Hypotheses to be tested

g) Operational Definitions of Concepts

 h) Methodology and Data Base

> » Type of research/Method of Study E.g. Descriptive, Analytical
>
> » Sources of data- Primary Data and Secondary data
>
> » Tools/instruments for Data Collection-
>
> • Interview Schedule • Questionnaire-mail • Observation

i) Technique used for data collection- Sampling or census – Specify the sampling method e.g. Random sampling – Determine the sample size – Select the final sample

j) Method adopted for the analysis of the Data-descriptive or inferential – Tools for the analysis- Mathematical and Statistical

k) Time Frame and Resource Requirements

l) Period of Reference/study

m) Limitations of the Study

n) Chapter Scheme of Presentation of the Study.

Chapter -3 Company /Respondent /product profile – Details of the company which your are studying including product – In case of free launcher project- data collected from respondent- then details about respondent profile.

Chapter -4 Analysis and interpretation/Results of The Work/Discussion

– Chapters based on the objectives of the Study

– Use of Tables/Graphs/Diagrams for effective representation

- Title, Source etc – Presentation style

 – Simple & Lucid Style with the help of application Mathematical & Statistical Tools.

– Testing of Hypotheses

Chapter-5 Findings and Conclusion- End Items/Terminal Items – Summary of Findings- numbering each of the finding – Conclusions- should be given so as to justify the objectives of the study.

Chapter-6 Recommendations/Suggestions – Recommendation/Model developed for improvement of operation-specific recommendations/suggestions to each of the objectives of the study. These recommendations should be specific, acceptable/practical and clear – Scope for further studies**.**

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