SHIVAJI UNIVERSITY, KOLHAPUR
CENTRE FOR DISTANCE EDUCATION

M. Com. Part-II

Research Methodology

Semester-III Paper-I

(From Academic Year 2014-15 onwards)
Unit-1
Research Basics

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1.0 Objectives:

After studying this unit, the students will be able to:

- Understand the concept of Research
- Know the objectives of Research
- Understand the Motivation in Research
- Study the Research Process
1.1 Introduction:

Research in common speaking refers to a search for knowledge. Research is a part and parcel of any systematic knowledge. The human urge for new areas of knowledge has developed a sense for search and research in him. Research has now become an integral part not only of academic pursuits but of all other areas like economics, physical science, social science, education, management etc. In short no academic body of knowledge and no functional area of activity would progress without adequate advancement in terms of research. Research is the last resort when individuals, organizations and societies face some problems for which there are no answers or when there is inconsistency among answers. The subjects of research are innumerable, depending upon the education faculty. Such as Social and Private behaviour, cultural habits, consumer behaviour, globalization, liberalization, privatization, physical world, planets, animals, human beings, transport communication, study of policies, computers, etc. Research is carried out to settle controversies, contradictions, misunderstandings and disputes about the nature of some aspect of the universe. It is a systematic way of knowing more about the world and us. Research can be done in arbitrary or in a systematic manners.

1.2 Subject Matter:

1.2.1 Meaning and Definitions of Research:

Research is a scientific and systematic search for pertinent information on a specific topic. In fact research is an art of scientific investigation. Research activity carried out by the each sector or subject to find out solution in general or in particular. The term research composed two words ‘Re’ and ‘Search’ which means search again and again. Dictionary definition of research is a careful investigation or inquiry especially through search for new facts in any branch of knowledge. Some people consider research as a movement from the known to the unknown. It is actually a voyage of discovery. We all possess the vital instinct of inquisitiveness. When the unknown confronts us more and more our inquisitiveness makes us probe and attain understanding of the unknown. This inquisitiveness is the mother of all knowledge and the method, which one employs for obtaining the knowledge of whatever the unknown, can be termed as research.
Research is discovery of facts, development of facts and verification of facts. Research is an endeavor to discover intellectual and practical solutions to the problems through the application of scientific methods to the knowledgeable universe. Research is the process which involves defining and redefining problems, hypothesis formulation, organizing and evaluating data, deriving deductions, inferences and conclusions, after careful testing. To understand the meaning of research it is necessary to go through the various definitions of research which are given by different authorities.

1. **Advanced Learner's Dictionary of Current English (Oxford):** Research defined as "A careful investigation or inquiry specially through search for new facts in any branch of knowledge."

2. **Random House Dictionary of the English Language:** Research is defined as "A diligent and systematic inquiry or investigation into subject in order to discover or revise facts, theories, applications, etc."

3. **Webster's Twentieth Century Dictionary:** Research is defined as "A careful, patient, systematic, diligent inquiry or examination in some field of knowledge undertaken to establish facts or principles."

4. **D. Slesinger and H. Stephenson:** In the encyclopedia of social sciences define research as "The manipulation of things, concepts or symbols for the purpose of generalising to extend correct or verified knowledge, whether that knowledge aids in construction of theory or in the practice of an art."

5. **Clifford Woody:** The research is defined as "The process which includes defining and redefining problems, formulating hypothesis or suggested solutions collecting, organising and evaluating data making deductions and reaching conclusions and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis."

6. **Kerlinger:** The research is defined as "A systematic controlled, commercial and critical investigation of hypothetical propositions about the presumed relations among natural phenomenon."

7. **Clover and Balsely:** The research is defined as "The process of systematically obtaining accurate answers to significant and pertinent questions by the use of the scientific method gathering and interpreting information."
8. **Bogardus:** The research is defined as "Social research is the investigation of the underlying processes operative in the lives of persons who are in association."

9. **P.V. Young:** Research may be defined as "A method of studying, analyzing and conceptualizing social life in order to extent, modify, correct or verify knowledge whether that knowledge aids in construction of theory or in practice or an art."

   Young has defined social research as "A Scientific undertaking which by means of logical and systematic technique, aims (i) to discover new facts or to verify and test old facts (ii) to analyse their sequences, interrelationships and casual explanation, (iii) to develop new scientific tools, concepts and memories that would facilitate reliable and valid study or human behaviour."

10. **Black and Champion:** "Scientific research concerns itself with obtaining information through empirical observation that can be used to systematically develop logically related propositions so as to attempt to establish casual relationships among variables."

    Thus, Research can be defined as, systematic investigation into and study of a subject in order to establish facts and arrive at new findings and conclusions. Research is the systematic approach concerning generalization and formulation of a theory. Research is a careful critical inquiry or examination in seeking facts or principle, diligent investigation in order to ascertain something. Research refers to the systematic method consisting of enunciating the facts and react certain conclusions either in the form of solutions towards the concerned problem or in certain generalization for some theoretical formulation. Research is a systematic enquiry seeking facts through objective verifiable methods in order to discover the relationship among them and to deduce from them broad principle or caws. It is really a method of critical thinking. It comprised of defining and redefining of problems, formulating hypothesis or suggested solutions, collecting, organizing and evaluating data, making deductions and making conclusions and at last carefully testing the conclusions to determine whether they fit in the formulated hypothesis.

**1.2.2 Characteristics of Research:**

Since, definitions of this type are rather abstract, a summary of some of the characteristics of research may help to clarify its spirit, meaning and methodology.
1. **Predictions for future occurrences:** Research emphasizes the development of generalization of principles or theories that will help in predicting future occurrences.

2. **Direction towards solution:** Research is directed towards the solution of a problem.

3. **Accuracy in observation and description:** Research demands accurate observation and description.

4. **Basis of research is experience:** Research is based upon observable experience or empirical evidence.

5. **Gathering of new data:** Research involves gathering new data from primary or basic source or using existing data for a new purpose.

6. **Research is a scientific program:** It tells us relationship between cause and effect. Research is directed towards what the solution of the problem or to answer question.

7. Research emphasizes the development of generalization of principles of theories which are helpful in prediction.

8. **Quest for answers:** Research involves the quest for answer to unsolved problems.

9. **Patient activity:** Research is characterized by patient and careful activity.

10. **Social relevance:** Research for the sake of research is not a research. Research always has social relevance.

11. **Objective and logical:** Research strives to be objectives and logical, applying every possible test to validate the procedures employed the data collected and the conclusions reached.

12. **Carefully designed procedures:** Research activities are more often characterized by carefully designed procedures always applying rigorous analysis.

13. **Needs expertise:** Research requires expertise i.e Skill necessary to carry out investigation, search the related literature and to understand and analyses the data collected.
14. **Task to discover, develop and verify knowledge:** Research is an endeavor to discover, develop and verify knowledge. It is an intellectual process that has developed over hundreds of years ever changing in purpose and always searching for truth.

15. **Careful critical inquiry:** Research means a careful critical enquiry or examination in seeking facts or principle, diligent investigation for ascertaining something.

### 1.2.3 Objectives of Research:

The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of research is to find out the truth which is hidden and which has not discovered as yet. Though each research study has its own specific purpose but general objectives of research are below:

1. To find out new knowledge or to achieve new insights into existing field of knowledge.

2. To describe or explain accurately the characteristics of a particular individual, situation or a group.

3. To determine the frequency with which something occurs or with which it is associated with something else. This type of study is diagnostic in nature.

4. To test a hypothesis of a causal relationship between variables.

These are general objectives of research in any field but researches in social sciences are different than researches in natural sciences. Social research is a scientific approach of adding to the knowledge about society and social phenomena. Particularly, the objectives of social research are as follows:

1. **Development of knowledge:** Sociology is the science that studies the social interactions or social phenomena. Every science has been stated below collects systematized body of knowledge about the branch or the subject-matter that it studies. For this, it applies the research as a method. The main purpose of research is to add to the knowledge. Similarly, social research is an organized and scientific effort to acquire further knowledge about the social phenomena and social facts. Social research is not an object itself.
2. **Scientific study of social life:** Social research is an attempt to acquire scientific knowledge about the social phenomena. The researcher makes study of the collective processes, social change, social structure social processes, etc. He also makes study of human being and collects data about various aspects of the social life and formulates laws in this regard. Once laws have been formulated, he tries to establish the inter-relationship between these facts. All these steps are intendant adding to the knowledge about social phenomena.

3. **Welfare of humanity:** Science is not an end in itself. The knowledge that is acquired is intended to bring about welfare of the humanity. Only for the sake of study no scientist or researcher makes study. He has to direct his study to some higher aim which invariably is 'Welfare of Humanity'.

4. **Classification of facts:** Every scientist has certain aims before him. These aims are guided by personal ambitions and use of the scientist. But in no case he can keep himself away from the object of clarification of facts.

5. **Social control and prediction:** Social research helps to make study of the social phenomena, events, and the factors that govern and guide them. Apart from that an analysis of the social life and the laws governing them can be presently scientific. The new laws that are the outcome of the scientific study are formed through study. Apart from all these, social relations and their dynamics can be studied. This study is helpful in social control and prediction of social behaviour.

In short, social research thus studies the social values, beliefs, traditions, events, etc. It also findsout new facts and verifies the old facts on the basis of that or tests applied to old facts. It also studies the dynamics of social relationship and social phenomena. All this study helps to control social life and prediction of the social behaviour. It means that social research is, theoretical as well practical. On one side through it knowledge is added, on the other side the social behaviour and behaviour of individual is controlled.

### 1.2.4 Objectives of Research in Commerce and Management:

Any social or economic Research may have mainly two objectives, academic objective and practical objectives. Though commerce and management are developed as social sciences, the objectives of research in commerce and
management are different. Research in commerce and management is basically meant for a specific purpose and that’s why management researchers are by and large result oriented. Research provides an analytical framework for the subject matter of investigation. It establishes the relation between the different variables. Research is based on observations, implications and evidences. It includes knowledge and understanding as well as decision making skill and ability. Due to research managerial efficiency is increased at high level. Though research is one with any of the general objectives noted above management research is done with any of the following objectives:

1. **Decision Making** – Decision taking is the main function of management. Management has to take decision regarding each and every activity which influences the working of the organization. Research gives proper guideline to take a proper decisions.

2. **Project Objective** – Managerial persons carried out different projects about business activities. Project objective of research stands for the research activities for identification of project to determine the feasibility of project, project planning, and implementation of the project etc.

3. **Policy Objective** – There is a corporate policy for any organization which is linked with the corporate objectives, organizational philosophy culture and organizational environment. Research cannot be separated from policy matters because these policy objectives effects on each and every activity of business.

4. **Controlling Objective** – Every manager as expected to be a controller and every management function has an element of controlling function in it. A manager has not only to control man power but also other resources. As well as controlling would be effective only if the controller has a comprehensive knowledge of man, money, machine and material. It is here the managerial research rises the occasion.

5. **Economic and Business Environment Objective** – An economic use of resources is one of the most important managerial functions. Optimum utilization of resources has to take into account in the areas of the investment, pricing, inventory, manpower etc. Commerce and management research has objective of analysis of business environment and on the basis of findings make optimum economic use of resources.
6. **Market Objective** – The market objective of management research may be defined as a research objective for achieving the market or sale of the product. It may include the research about market share, penetration, marginal sales volume, business growth etc. Market research and marketing research may come under this category.

7. **Product Development and Innovation Objective** – Product development is required to maintain the market as well as to acquire new market. Extensive research is carried out in connection with product development, both for new product development and for modify the existing product and for this purpose innovation is must. There is research and Development department to fulfill this objective in most of the business organizations.

8. **Customer Satisfaction Objective** – Now a days customer satisfaction has become the main and most important objective of any organization. To achieve this objective it is necessary to find out first the actual needs of customers and then products are produced accordingly. Research is useful to ascertain the needs of customers and other related information.

9. **Corporate Image Objective** – The setting of the corporate image or goodwill is depending on the organization’s relations with external groups. The manner and method used to achieve objectives have an effect on employees, customers, competitors, government and general public. Therefore it is necessary to develop organizational social philosophy which guide it action in relation with each stakeholder. Research has very important role to play in this respect.

In short research has very vital role to play in the field of commerce and management and hence its scope is tremendous as far as management is concerned.

**1.2.5 Motivation in Research:**

There are different motives behind the research. The motive in research depends on the researcher, type of research, necessity of research etc. Mrs. P. V. Young has given four motivating factors in social research. These factors are as following:

1. **Curiosity for unknown:** Human being has a natural instinct of curiosity or an eagerness. This curiosity for any unknown matter, quest for knowledge leads to undertake research activity.
2. **Search for cause-effect relationship:** Nothing can happen without reason. So research is made to find out the reasons behind a particular phenomenon that is cause and effect relationship. It is helpful to solve many problems.

3. **Interest in novel and unusual:** Many sudden, novel and unusual events happen in human life or nature which does not fit in any normal logical. Such events encourage the researcher to study the nature of happening and find out reasons as well as future actions.

4. **Refinement of techniques of research:** There are different techniques of research. Each technique has its own merits and demerits. So selection of proper technique for research is important one. There is also need to refinement of techniques. It will leads to undertake research activity.

5. **Other Motives:** There are so many other motives also behind the research activity. Some of them are as follows -
   a) Desire to get intellectual satisfaction of doing creative work.
   b) Desire to get respect in the society.
   c) There is a desire to get research degree and subsequently to get applicable benefits - financial as well as non-financial incentives.
   d) There is a desire to render some kind of service to the society.
   e) Desire to face the challenge of solving the unsolved problem.

However, the motivation depends upon the nature, scope, quality, depth and the time-limit of the research.

### 1.2.6 Research Process:

The word ‘Process’ itself explains that there are different interrelated activities carried out one after another continuously till the end. Research process is not exception to this. Research process consists of series of actions or steps necessary to effectively carry out research.

But such activities overlap continuously rather than following a strictly prescribed sequence. At times, the first step determines the nature of the last step to be undertaken. If subsequent procedures have not been taken into account in the early stages, serious difficulties may arise which may even prevent the completion of
the study. One should remember that neither various steps involved in a research process are mutually exclusive; nor they are separate and distinct. They do not necessarily follow each other in any specific order and the researcher has to be constantly anticipating at each step in the research process the requirements of the subsequent steps. The chart indicates that the research process consists of a number of closely related activities, as shown through I to XI.
However, the following order concerning various steps provides a useful procedural guideline regarding the research process: (i) formulating the research problem; (ii) extensive literature survey; (iii) developing the hypothesis; (iv) preparing the research design; (v) determining sample design; (vi) collecting the data; (vii) execution of the project; (viii) analysis of data; (ix) hypothesis testing; (x) generalizations and interpretation; and (xi) preparation of the report or presentation of the results, i.e., formal write-up of conclusions reached.

A brief description of the above stated steps will be helpful.

1. **Formulating the research problem**: This is the first step in research process.

   There are different types of research problems. It may be as per nature or related to relationships between variables. In the beginning, the researcher should find out the problem he wants to study, i.e. he must decide the general area of interest or a subject-matter to inquire into. Primarily the problem may be stated in a broad term and then the ambiguities regarding the problem to be resolved. Then, the feasibility of a particular solution has to be considered before a working formulation of the problem can be decided. The formulation of a general topic into a specific research problem thus becomes the first step in a scientific inquiry. The two steps are involved in formulating the research problem, viz. thoroughly understanding of the problems and rephrasing the same in meaningful terms from an analytical point. Proper way of understanding the problem is to discuss it with the colleagues or with experienced people. The researcher must at the same time examine all available literature to get himself familiar with selected problem. Researcher must take the review of literature. This review may be of two types — the conceptual literature review regarding the concepts and theories and the empirical literature review consisting of studies made earlier which are similar to the one proposed. The basic outcome of this review will be the knowledge regarding what data and other materials are available for operational purposes which will help the researcher to specify his own research problem meaningfully. This task of formulating or defining a research problem is very important in the entire research process. The problem to be investigated should be defined clearly so that will help discriminating relevant data from irrelevant ones.
2. Extensive literature survey: After formulating the problem a brief summary of it should be made. This summary or short report can be made with the help of extensive literature survey. It is compulsory for a researcher writing a thesis for a Ph.D. degree to write a synopsis of the topic and submit it to the concerned committee for the purpose of approval. At this time the researcher should undertake extensive literature survey connected with the problem. The abstracting and indexing journals and published or unpublished bibliographies are the first place to proceed with for this purpose. Academic journals, conference proceedings, government reports, books, etc. must be referred to depending on the nature of the problem. At this stage a good library will be very useful to the researcher.

3. Development of working hypothesis: After extensive literature survey researcher should state the working hypothesis clearly. Working hypothesis is tentative assumption made for drawing out and tests its logical or empirical effects. As such the method in which research hypothesis are developed is important since they provide the focal point for research. They also affect the method in which tests must be conducted in analysing data and indirectly the quality of data which is needed for the analysis. In most types of research, the development of working hypothesis plays an important role. Hypothesis should be very specific and limited to the work of research in hand, as it has to be tested. The hypothesis has to guide the researcher by delimiting the area of research and to keep him on the right path. It helps to sharpen his thinking and focuses attention on the more important facets of the problem. It also shows the type of data needed and the type of methods to be used for at data analysis. Working hypothesis can developed by taking into consideration the different things like Discussing with colleagues and experts regarding the problem, Examining data and records, trends, peculiarities and other clues, Reviewing similar studies in the area or the studies on similar problems and Exploring personal investigation.

Thus, working hypothesis arise due to a prior thinking regarding subject, examination of the available data and material including related studies and the counsel of experts and interested parties. Working hypothesis is more useful when stated precisely and clearly.
4. **Preparing the research design:** This is one of the most important steps in research process. After formulating clearly the research problem, the researcher will be required to prepare a research design, i.e. stating the conceptual structure within which research would be conducted. The preparation of such a design facilitates research to be efficient so that maximum information can be obtained. In other words, the function of research design is to provide for the collecting relevant evidence with minimum expenditure of effort, time and money; but how all these can be achieved mainly depends on the purpose of research. Research purposes generally are grouped into four categories, viz., (i) Exploration, (ii) Description, (iii) Diagnosis, and (iv) Experimentation. The research design is framed on the basis of any one concerned purpose of research mentioned above. The preparation of the research design, appropriate for a particular research problem, involves the following consideration : (i) The means of obtaining the information, (ii) The availability and skills of the researcher and his staff, (iii) Explanation of the way in which selected means of obtaining information will be organized, (iv) Time available for research and (v) Availability of finance.

5. **Determining the sample design:** All the items under consideration in any field of an inquiry constitute a 'universe or population'. A complete record or information of all the items in the 'population' is called a census an inquiry. In such an inquiry it can be assumed that when all the items are covered no element of chance is left and highest accuracy is obtained but in practice this may not be true. Even the slightest element of bias in such an inquiry will get larger and larger as the number of observations increases and there is no way of checking the element of bias or its extent except through a resurvey or use of sample checks. Again this type of an inquiry involves a great deal of time, money and energy. This census enquiry is difficult in practice under many circumstances. The researcher should decide the way of selecting a sample or the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. There are different types of sampling designs such as (i) Deliberate sampling, (ii) Simple random sampling, (iii) Systematic sampling, (iv) Stratified sampling,(v) Quota sampling, and (vi) Cluster sampling and Area sampling, (vii) Multi-state sampling, (viii) Sequential sampling. In practice, many methods of sampling
described above may be used in the same study in which case it can be called mixed sampling. Normally, one should resort to random sampling so that bias can be avoided and sampling error can be estimated. But the purposive sampling is considered desirable when the universe happens to be small and a known characteristic of it is to be studied intensively. The sample design to be used must be decided by the researcher taking into consideration the nature of an inquiry and other related factors.

6. **Collecting the data:** Collection of data is very important step in research process. There are two sources of data collection, and data collected from these sources is called as primary data and secondary data. Primary data means the data collected by the researcher first time and the secondary data means the data which is collected by any other person and used by the researcher. Many times data at hand are inadequate, and therefore it is essential to collect data that are appropriate. There are many ways to collect the appropriate data which differ in terms of money costs, time and other resources at the disposal of the researcher.

Primary data can be collected through experiment or through survey. If the researcher conducts an experiment, he observes some quantitative measurements or the data with the help of which he examines the truth given in his hypothesis. Primary data is collected through observation, interview, questionnaire etc. Secondary data is collected through library, internet etc. The researcher should select one of these methods of collecting the data considering the nature of investigation, objective and scope of the inquiry, financial resource, available time and the desired degree of accuracy. Though he should pay attention to all these factors but much depends upon the ability and experience of the researcher.

7. **Execution of the project:** This is a very important step in the research process. Execution of the project means implementation of the research work as per the plan. If the execution of the project proceeds on correct lines, the data to be collected would be adequate and dependable. The researcher should see that the project is executed systematically and in time. If the survey is to be conducted by structured questionnaires data can be readily machine-processed. In such cases, questions and possible answers may be coded. If the data are to be collected through interviewers, arrangements should be made for proper selection and training of the interviewers. Occasional field checks should be
made to ensure that the interviewers are doing their assigned job sincerely and efficiently. The collected information should be in according to the pre-defined standard of accuracy. Various efforts should be taken for securing response.

8. **Analysis of data:** After the data have been collected the researcher has to analyze them. The analysis of data needs many closely related operations such as establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences. The raw data should be condensed into a few manageable groups and tables for further analysis. Thus, the researcher should make classification of the raw data into some meaningful and usable categories. Coding operation is usually done at this stage through which the categories of data are transformed into symbols that may be tabulated and counted. Editing is the procedure that improves the quality of the data for coding. Tabulation is a part of the technical procedure in which the data is classified into tables with the help of computers. Analysis work is based on the computation of various percentages, coefficients, etc. by applying various well defined statistical formulae. In the analysis process, relationships or differences supporting or conflicting with original or new hypothesis should be subjected to tests of significance to determine with what validity data can be said to indicate and conclusions. The researcher can be analyze the collected data with the help of various statistical measures.

9. **Testing of hypothesis:** After analyzing the data the researcher has to test the hypothesis. Whether the facts support the hypothesis or are they contrary? This is the usual question which should be answered while testing hypothesis. Various tests such as Chi-square test, t-test, F-test have been developed by statisticians for this purpose. Depending upon the nature and object of research inquiry, the hypothesis may be tested through the use of one or more of such tests. Hypothesis-testing will result in either accepting the hypothesis or in rejecting the hypothesis.

10. **Generalization and interpretations:** If a hypothesis tested and upheld several times the researcher can arrive at generalization i.e., to build a theory. The real value of research lies in its ability to arrive at certain generalization. If the researcher had no hypothesis to start with, he might try to explain his findings on the basis of some theory, it is called interpretation. Many times the process of
interpretation may rise off new questions which subsequently lead to further researches.

11. **Preparation of the report or the thesis:** Finally, the researcher has to prepare the report of what has been done by him. Writing a report must be done carefully. Generally the layout of the report includes (i) the preliminary pages or introductory part, (ii) the main text and (iii) the end matter. In its preliminary pages the report should carry title and date followed by acknowledgments and forward. Then, there should be a table of contents followed by a list of tables list of graphs and charts, if any mentioned in the report. The main text of the report should contain the introduction; the main body of the report should be presented logically and divided into readily identifiable sections, Summary of findings and Conclusion. At the end, the researcher should again write the results of his research clearly and precisely. At the end of the report, appendices should be enlisted regarding all technical data. Bibliography, i.e. list of books, journals, reports, etc., consulted also should be given at its end. Index should be given.

Report should be written in a concise and objective style in simple words avoiding vague expressions such as ‘it seems’, ‘there may be’, ‘majority of’ and such as the like. Charts and illustrations in the main report should be used. A research work is not completed until it is reported. The most crucial findings that a researcher might have come out with will be of little use unless they are communicated to other in the form of research report.

1.3 **Summary:**

Research in common speaking refers to a search for knowledge. Research is a part and parcel of any systematic knowledge. The human urge for new areas of knowledge has developed a sense for search and research in him. Research has now become an integral part not only of academic pursuits but also of all other areas like economics, physical science, social science, education, management etc. In short no academic body of knowledge and no functional area of activity would progress without adequate advancement in terms of research. Research is the last resort when individuals, organizations and societies face some problems for which there are no answers or when there is inconsistency among answers. Research can be defined as, systematic investigation into and study of a subject in order to establish facts and arrive at new findings and conclusions. Research is the systematic approach
concerning generalization and formulation of a theory. Research is a careful critical inquiry or examination in seeking facts or principle, diligent investigation in order to ascertain something. Research refers to the systematic method consisting of enunciating the facts and react certain conclusions either in the form of solutions towards the concerned problem or in certain generalization for some theoretical formulation. Research is a systematic enquiry seeking facts through objective verifiable methods in order to discover the relationship among them and to deduce from them broad principle or caws. It is really a method of critical thinking. It comprised of defining and redefining of problems, formulating hypothesis or suggested solutions, collecting, organizing and evaluating data, making deductions and making conclusions and at last carefully testing the conclusions to determine whether they fit in the formulated hypothesis.

The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of research is to find out the truth which is hidden and which has not discovered as yet. Though each research study has its own specific purpose, but general objectives of research are like, to find out new knowledge or to achieve new insights into existing field of knowledge, to describe or explain accurately the characteristics of a particular individual, situation or a group, to determine the frequency with which something occurs or with which it is associated with something else, to test a hypothesis of a causal relationship between variables. Any social or economic research may have mainly two objectives, academic objective and practical objectives. Though commerce and management are developed as social sciences, the objectives of research in commerce and management are different. Research in commerce and management is basically meant for a specific purpose and that’s why management researchers are by and large result oriented. Research provides an analytical framework for the subject matter of investigation. It establishes the relation between the different variables.

Research process consists of series of actions or steps necessary to effectively carry out research. The various steps involved in a research process are neither mutually exclusive nor they are separate and distinct. However, the following order concerning various steps provides a useful procedural guideline regarding the research process: (i) formulating the research problem; (ii) extensive literature survey; (iii) developing the hypothesis; (iv) preparing the research design; (v) determining sample design; (vi) collecting the data; (vii) execution of the project;
(viii) analysis of data; (ix) hypothesis testing; (x) generalizations and interpretation; and (xi) preparation of the report.

1.4 Check Your Progress:

A. Choose the correct alternative:

1. Generally the layout of the report includes ----------------
   i. the preliminary pages or introductory part  ii. the main text
   iii. the end matter  iv. all of above

2. Research is characterized by -------- activity.
   i. patient  ii. careful
   iii. systematic  iv. All of above

3. Research -------- the managerial efficiency.
   i. decreases  ii. increases
   iii. not affected  iv. none of above

4.  -------- data can be collected through experiment or through survey.
   i. Primary  ii. Secondary
   iii. Both  iv. None of above

5. A complete record or information of all the items in the 'Population' is called as a --------
   i. sampling  ii. survey
   iii. census  iv. none of above

B. Fill in the blanks:

1. Research explains us relationship between cause and effect.

2. Research is directed towards the solution of a problem.

3. Research always has social relevance.

4. Editing is the procedure that improves the quality of the data for coding.

5. Research process consists of series of actions or steps necessary to effectively carry out research.
C. **State True or False:**

1. Research for the sake of research is not a research.
2. The main aim of research is to find out the truth which is hidden and which has not discovered as yet.
3. The various steps involved in a research process are neither mutually exclusive; nor they are separate and distinct.
4. A research work is not completed until it is reported.
5. Execution of the project means implementation of the research work as per the plan.
6. The selected items under consideration in any field of inquiry constitute a universe or population.

1.5 **Key Terms:**

- **Research:** Research is a careful investigation or inquiry especially through search for new facts in any branch of knowledge. It is the process which includes defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.

- **Social research:** Social research is the investigation of the underlying processes operative in the lives of persons who are in association.

- **Research process:** Research process consists of series of actions or steps necessary to effectively carry out research. The various steps involved in a research process are neither mutually exclusive; nor they are separate and distinct.

1.6 **Answers to Check Your Progress:**

**A.** – 1 – iv, 2 – iv, 3 – ii, 4 – i, 5 – iii

**B.** – 1 – cause, effect 2 – solution 3 – social 4 – Editing

5 – Research Process

**C.** – 1 – True 2 – True 3 – True 4 – True 5 – True 6 - False
1.7 Exercise:

1. What is Research? Explain the characteristics of Research.
2. What are the objectives behind the research in commerce and management?
3. Briefly describe the different steps involved in a research process.
4. What do you mean by Research? Explain the motives in research.

1.8 Further Readings:

2. Dr. V. P. Michael, Research Methodology in Management, Himalaya Publishing house, Mumbai.
2.0 Objectives:

The basic objective of this unit is to make understand reader about the concept of research design and different types of research design. This is a basic document a blueprint of proposed research. The central cord of any research is a research question and hypothesis. The unit also makes understand reader about the research question and hypothesis.
2.1 Introduction:

Previous chapter makes us understand about the subject research. Research is imbibed in human kind since its birth owing to curiosity that we are born with.

Research design is a comprehensive documents detailed the research is to be undertaken. The points this document covers is research problem, social problem or organizational problem, statement of research problem, hypothesis, objectives, scope of research, research design which includes data requirements, data sources, instrument to get the primary data, sampling design, data analysis design, observational design and lastly the planning of articulation of research report.

2.2 Presentation of Subject Matter:

Research Design:

Research design is a comprehensive document which navigates to the researcher throughout the research work. It is blue print of research voyage. For any doubt at any moment the research design guides researcher.

Components of Research Design

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

The clarification of such questions given below. Careful consideration of the following questions.

The questions like,

What the study is about? – It means what is the statement of hypothesis put to test.

What to observe? - This answers what objectives are set for study. What variables are to be observed in the sample.

Why the study is made? - Every study has its own relevance and meaning. The relevance conveys importance of study. This answers on the applications of study undertaken.

From whom to get relevant data? - This answer to this question reveals sampling for study.
When to study? - this conveys time or period the study to be undertaken.

How to investigate? – this talks about methodology adopted for the study.

How to analyze? – it narrates the method of data analysis. The tools used to analyze the data.

**Definition of Research Design:**

Research scholars across world define research design as follows.

1. “A Research Design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.” - Selltz

2. “A Research Design is a master plan specifying the methods and procedures for collecting and analysis the needed information.” - William Zikmund

3. “The planned sequence of the entire process involved in conducting a research study.” Prof. Miller

4. “The design results from controlling general scientific model into varied research procedure.” Prof. Young

5. “A research design provides the framework to be used as a guide in collecting and analyzing data.”

6. “A research design is a logical and systematic planning and it helps directing a piece of research.” Nargundkar, R.

7. “Design is the process of making decisions before situation arises in which the decision has to be carried out. It is a process of deliberate anticipation directed towards bringing an unexpected situation under control.” B.D. Kulkarni, D. (1996).

8. “Research design is the conceptual structure within which research is conducted; it constitutes the blue print for the collection, measurement and analysis of the data.” – Hasouneh, A. B. (2003).

Definitions above are self explanatory and narrates that research design is a planned document which tells everything about a proposed research. It is a blue print of a research.

Four research designs are existed.
1. Exploratory research design

2. Descriptive research design

3. Diagnostic research design

4. Experimental research design

Research designs mentioned above is a logical sequence. To suffice newly evolved want, to answer newly evolved questions and to find out solutions to newly evolved problems, exploration is warranted. Variables out of exploration are enough to describe population using descriptive research and establishment of relationships is done using diagnostic research design. Fool proof outcomes of diagnostic research are tested over a period of time in different circumstances to generalize outcomes to the population. This is done using experimental research design. Successful experimentation is then generalized to population as a solution to problem defined in exploratory research design. A cycle of proposing solution to a problem hence, begins at exploration and end up with experimentation.

1. **Exploratory Research Design**

Very meaning of exploration reveals to bring a float altogether new thing. Exploratory research design is used to find the solution for new problems.

Definitions of exploratory research designs are,

Exploratory Research Design refers to, “Formulating a problem for more precise investigation or of developing the working hypothesis from an operational point of view.” – **Garg, C. R. (2014)**

Exploratory Research Design refers to, “Conducted as a preliminary step to clarify and define the nature of a problem.”– **Zikmund, W. G.**

“A Flexible design which must provide opportunity for considering different aspects of the problems.” –B.D.Kulkarni, D. (1996)

“It is systematic scientific and at times the only when through which a social scientists can check whether an idea, that sounds promising to him, has much appeal in reality or not.” –**Hasouneh, A. B. (2003)**
Exploratory research manifest with something new in the domain or concept. The exploration facilitates further thinking in different perspective. It may also facilitate the discussions and debates which are well explained and tested using descriptive research design.

Feature of exploratory research design is, it is very flexible because, no one can predict as to how much time the exploration would require. Resources required for exploratory research design could not be limited.

2. **Descriptive Research Design**

Outcomes of exploratory research design are the inputs to the descriptive research design which facilitates to check the scenario of variables manifested from exploratory study within the existing population.

Descriptive research design answers the question, what it is about? and it does not probe into the reasons behind the population scenario towards defined variables.

Definitions of descriptive research design are,

Descriptive Research Design refers to, “Which are concerned with describing the characteristics of a particular individual or of a group.”– Garg, C. R. (2014)

“The Descriptive research designs enable researcher to describe or present pictures of a phenomenon or phenomena under investigation.” –Hasouneh, A. B. (2003)

“The true beginning of scientific activity consists…describing phenomena and (Only) then in proceeding to group, clarify and correlate them...” –Bhandarkar, W. &. (1992).

Features of descriptive research design are,

- It has resource constraints especially time and money
- The design is rigid and does not allow many changes
- The outcome of descriptive design only describes the population under study with respect to set of defined variables using different descriptive statistical tools.
3. **Diagnostic Research Design**

Variables well defined in descriptive research design are taken to find out its interrelations, dependability and the like. The design used to seek some sort of solution to the problem observed and under study. It purposefully establishes the relationships between variables to find out the extent of different variables are contributing to the existing problem and the like.

Definitions of research designs are,

- Diagnostic Research Design refers to, “Determining the frequency with which something occurs or its association with something else.” – Garg, C. R. (2014)


- “It is the most typical and simple problem solving strategy of the helper faced with problems and crises on the job.” – B. D. Kulkarni, D. (1996)

- “It may be concerned with discovering and testing whether certain variables are associated.” – Bhandarkar, W. &. (1992)

- “Diagnostic Research Design refers to Scientific differentiation among various conditions or phenomena for the purpose of accurately classifying these conditions.” - Hasouneh, A. B. (2003)

Above definitions concludes that diagnostic research design is used for problem solving using different inferential statistical tools.

4. **Experimental Research Design**

Experimentations are a base in physical sciences like chemistry, physics, botany and the like. In social sciences especially experimentations are now widely used to find out behaviour of human being. In management human beings are considered as a customer, consumer, employees, middlemen and the like. Studying behaviour of such human being under different circumstances is of use in decision making. Hence, management practitioners and researchers are using experimental research design.

Experimental research design necessarily follows a hypothesis and seeks relationship between two or more variables.
“More than a hundred ways of conducting such experiments and each these may be termed as a experimental design.” -Donald Cambell & Julian Stanley

“Experimental research is designed to assess the effects of a particular variables on a phenomenon by keeping the other variables constant or controlled.” – M.Ranganatham, D. O. (2005)

“In Experimental Design the researcher can often exert a great deal of control over extraneous variables and thus ensure that the stimuli in the experimental conditions are similar.” – Hasounah, A. B. (2003)


Experimental research design follows three basic principles

One is principal of randomization – it refers to selection of samples strictly on random basis to avoid possible biases.

Second is principal of replication – this means that experimentation should be repeated more times. This may bring afloat extraneous variables which has impact on results in experimentation.

Third principal is principal of local control- this refers to allow the indulgence of extraneous variables to play role in experimentation. This would allow researcher to know about extraneous variables which cause variability in measurement. Extraneous variables then are studies for its inclusion in experimentation to minimize experimental error.

Features of Good Design

1. Reliability of data – good research design has more reliability of data collected. Reliability refers to correctness of opinions collected from samples.

2. Experimental error – repetitive execution of research design in different context if gives same results or similar results then it is considered to have less experimental error and treated to be a good research design.

3. Information yields – researchers requires more data and information to test hypothesis and suffice objectives effectively. The design which yields more data and information with shallow instrument termed to be a good research design.
4. Flexibility – it means the design should be able to consider many different aspects of a problem under study.

5. Economical – research design which consumes less resources especially money and time and provides maximum utility is considered to be economical research design.

Besides above mentioned points of features of good research design. Every practical research has sampling design, statistical design, observational design and operational design as their important components.

2.3 Types of Research

As far as management science is concerned types of research can be classify in two groups one is on the basis of application and second is on the basis of method of investigation.

<table>
<thead>
<tr>
<th>Application</th>
<th>INVESTIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure or basic</td>
<td>Experimental research</td>
</tr>
<tr>
<td>Applied</td>
<td>Surveys</td>
</tr>
<tr>
<td></td>
<td>Case studies</td>
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<td></td>
<td>Ex post facto research</td>
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<td>Action research</td>
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<td>Field investigation</td>
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<td></td>
<td>Evaluation research</td>
</tr>
<tr>
<td></td>
<td>Library research</td>
</tr>
</tbody>
</table>

On the basis of application:

a. Pure or Basic Research:

It is termed as fundamental research. Exploratory research design is used for pure or basic research. Prime objective of pure research is to facilitate momentum towards a solution to concurrent and unresolved problems. Theoretical construct is provided by pure research.
b. **Applied:**

Applied researcher sought immediate solution to the problem under study. Descriptive, diagnostic and experimental research design is used to seek solutions to problems.

**On the basis of Investigation:**

The type of research on the basis of investigation refers to method which brings in use to conduct research.

c. **Experimental Research:**

Experimental research deals with undertaking actual experimentation. This research method is widely used in physical sciences viz. chemistry, geology, physics etc. in social sciences as well use of experimental research design has of great importance. For example, retail merchant wish to know reactions of customers on different shelf display. Experimentation can be designed to know fact of customer reactions on different arrangements of products displayed on shelf.

d. **Surveys:**

Surveys in management science are known as sample survey since population is very large in size and unattainable with limited resources. Hence, samples are selected using sampling design and opinions of samples on subject matter are taken with the help of either schedule or questionnaire. Surveys are preferably undertaken using descriptive and diagnostic research design and yields primary data.

For example, opinions of MBA students towards syllabus of respective university for use of getting employment. This study can be conducted using survey research.

e. **Case Studies:**

A case is a description of situation…(consisting) of a few pages of written description of an actual situation facing an organization…. (Describing) how the current position developed and what problem a key personality in the case is currently facing. – Easton (1982).

Case study reveals to an in-depth study of a single unit. The unit may be an organization, city, industry and the like. Case study involves narration of the entire situation revolves around the subject under study.
f. Ex Post Facto Research:

In ex-post factor research effort has been made to establish relationship between two or more variables under study. One variable may be dependent variable (y) and another is independent(x).

g. Action Research:

Action research refers to gathering data or information out of actual actions or experimentations undertaken with samples in field. Say a newly launch washing detergent powder company wish to know opinions of housewives. In this case a team of researchers would move in selected clusters in city actually exhibiting washing process on cloths gathers from sample house. After washing opinions of housewives would be taken and assessed. Action research is widely used in marketing management.

h. Field Investigation:

This type of research is widely used in history.Filed investigation research refers to search or verify facts visiting to the field. In management science also verifying suitability of location for factory could accommodate in field investigation.

i. Evaluation Research:

Various projects are undertaken in an organization eg. Training and development program, employee engagement program, employee motivational program in which organization invests amount. Likewise respective government also undertakes several programs or projects with an object of wellbeing of different strata’s of society. In such projects government invests crores of rupees. What happen with such projects after implementation? Whether the targeted objects are suffice or not? No one knows. Evaluation research is used to assess the performance of such projects.

j. Library research:

Library research is typically based on secondary data. Researcher engaged time seating in library and collects required data from secondary sources viz. books, journals, magazines, newspapers, compact disks, manuals, biography, autobiography and the like. Few libraries keep records of economic and financial matters over period of time eg. Gokhale Institute of Economics, Pune.
2.4 Research Question

Research question refers to, what is it you are trying to find out? These questions arouse curiosity in the mind of researcher and tempted researcher to find the answer for the same. Research question is at center point of any research.

Always researchers’ confuse themselves in research topic and research problem. From purview of scientific research; it is the research problem which is most important than a topic. Research problem always talks about research question under investigation.

Research question should not be too broad creating an ambiguity in mind of researcher and it should not be too narrow so that nothing is left to carry out research.

Steps to develop a research question:

1. Social/managerial issues or problem: understand the social or managerial problem or issues. The problem or an issue observed from the field directly or read in the sources.

2. Collection of secondary data; if available regarding issue or problem observed.

3. Raise as many questions as possible around social or managerial problem observed.

4. Analyze and prioritize questions raised.

5. Select best question for research.

6. Convert best selected question into hypothesis.

For example:

Education was a taboo decades back for female in India. Indians have witnessed many revolutions for female education. Growing percentage of female education reveals that female are entering in every economic sector whether it is business, service or profession. Female are securing highest ranks and merits in academics in specific. This general observation leads to many questions in mind of researcher.

1. Are female more intelligent?

2. Is female IQ more?

3. Are female more ambitious?
4. Do female imbibe qualities and competencies that make them so successful?
The list of questions would be even more.
For this example question number one raised above has been taken.
Research question: Are female students more intelligent than male students?
Now this questions is relatively broad in nature since it does not talk about
students of which age, which class etc. besides this; the question does not reveal how
intelligence is going to be measured?
Revised Research Question: Do female student’s score higher than male
students in final examination of MBA course in Shivaji University?
The stated revised question is specific enough and does not leave any ambiguity.
Research question talks about testing intelligence with the help of scores of final
examination. Examination is also specified i.e. MBA examination conducted by
Shivaji University. Scores of male and female would be compared to arrive at result.
From stated revised research question; the hypothesis can be stated.
Null hypothesis could be that, ‘significant difference does not exist in the marks
scored by male and female students in MBA examination’.
The ideal research question is one which defines problem in the form of a
question. Unbiased answer to the same research question reveals null hypothesis.

2.5 Hypothesis:
Numerous scholars define hypothesis is their own perspectives as,
Hypothesis as a possible explanation of the phenomenon under observation…
Prof. C.T.Curien……..
“A hypothesis is a conjectural statement, of the relation between two or more
variables.” Kerlinger
“The guesses he (researcher) makes are the hypothesis which either solve the
problem or guide him for further investigation.” –Werkmeister
“Hypothesis as a testable statement of a potential relationship between two and
more variable.” – Mc Guigan
Term hypothesis as a “Proposition, condition or principle which is assumed, perhaps without belief, in order to draw out it’s logically consequences and by this method to test its accord with facts which are known or may be determined.” - Webster’s new international Dictionary of English language

“Hypothesis is an explanation held after careful canvass of known facts, in full knowledge of other explanations that have been offered and with a mind open to change of view, if the facts disclosed by the inquiry warrant a different explanation.” — Chaddock

Aforesaid definitions states that, hypothesis is…..

1. Possible explanation of phenomenon - this is a guess
2. Establish testable hypothetical relation between two or more variables – hypothesis is always testable.

Meaning of Hypothesis:

Hypothesis is tentative assumptions put to test. It is an unproved theory and educated guess. Any statement is not a hypothesis but statement done on the basis of educational qualification and out of rich experience is termed as hypothesis. Always words of seniors, experience people and their advice is respected it is because statement is not done casually but out of experience. If elite political personality, teacher, scientists says something it is not out of casual guess but out of experience, thought, vision and the like. Statement of hypothesis is also made the basis for any discussion and debate as well. Before taking any major decisions in a corporate and even in a nation at large, decision might have impact on large people, masses the decision always put to discussion and debate so as to learn people could wisely guess consequences of it. No one is sure about consequences but guess is termed as hypothesis.

Concept of Hypothesis:

A hypothesis is an alternative answers to research question; research determines which of these alternative answers is correct.

Hypothesis is a preposition that researcher wants to verify.

Hypothesis are generally concerned with

✓ causes of certain phenomenon or
relationship between two or more variables under investigation.

**Sources of Hypothesis:**

Besides many there are three major sources of hypothesis as follows.

- Theory/ Previous Research
- Management Experience/ Observations
- Exploratory Research

Following are some of examples of above mentioned sources of hypothesis.

**Theory/ Previous Research**

Theory build by earlier researchers can be put to test again, since the theory has built few times back which may not be relevant in today’s context. Statement can readily be gathered from previous research. Researcher always undertakes research work with certain scope. As well as handled few variables. It might possible that certain areas where researcher find a scope to conduct a research. Few questions researcher has in mind which has not been answered in researcher’s present research. Such reporting researcher does in scope for further study in either in the form of research problem or hypothesis.

1. Advertisement of FMCG products broadcasted on prime time leads to purchase intention.
2. Match between product and celebrity personality has a positive impact on prospective customers.
3. Celebrity endorsing many brands creates confusion in customers’ mind.
4. More internal locus of control a salesperson, higher the sales performance, or more external a salesperson, lower the sales performance.

Considering above examples researcher has already conducted in some context it need attention to conduct in different context to check similarity in outcome or otherwise. Hypothesis tested earlier by other researchers might need retesting later to check its validity.
Management Experience/ Observations

People spend life together working in a particular domain gathers experience vis-à-vis unresolved problems or problems which arises frequently. Such unresolved questions or problems are better answered by experienced people but which are again skeptical means answers may not be perfect. Those are needed to be tested again.

Examples of statement of hypothesis from management experiences or observations are,

1. Leadership style and organization effectiveness are independent.
2. Organization culture includes policies and working environment provided to employee which has no any impact on organizational effectiveness.
3. The children buy products on the basis of their sensory judgments, mostly created by marketing communications and not necessarily their thinking process.
4. A child can influence to a great extent their parent’s high involvement purchase.
5. The parents actually listen to their kid while purchasing high involvement products.

Exploratory Research

These are gray areas in research. Researcher wishes to bring afloat a new fact which has not discovered earlier by any researcher. Brainstorming, thinking out of the box for finding solutions to problems helps for formulation of a statement of hypothesis for exploratory research. Following are few examples of exploratory research.

1. A QWL in unionized organization does not differ than QWL in non-unionized organization.
2. Value added farm product business stops migrations of educated rural youth.
3. Marketer focuses on individual segmentation seeks greater market penetration.
4. The life style of urban women and rural women are alike.
In few cases especially in exploratory research most reasonable hypothesis statement is simply a trivial restatement for research question.

eg. Question: will the advertisement attract attention?

Hypothesis: advertisement attracts attention.

In such case hypothesis will not add anything to research and should simply be omitted. Hence, trivial statement or common sense statements are not considered as a hypothesis.

**Formulation of Hypothesis**

Hypothesis formulated using two major ways.

One is observation of a particular phenomenon, pattern or an event. Then observe pattern of implications of event or phenomenon. Ask question why this pattern arises. Answer to this question is tentative proposition i.e. hypothesis.

Another approach is formulating a statement of hypothesis from earlier researchers or theory building. Statement which might bridge gap in existing theory or statements from different researchers arouses controversy that is findings from two different researchers are contradictory to each other. This leaves space to formulate a statement of hypothesis.

Example:

This is generally observed and experienced phenomenon now a days that, MBA graduates are less employable. Reason behind such unemployment could be inappropriate syllabus, teaching pedagogy, gap between industry expectations from MBA graduates and actual performance and the like. This phenomenon leads many questions few are as follows,

To what extent are MBA syllabus and pedagogy contributing in development of employability skills in MBA students?

To what extent does an MBA course actually emphasis development of employability skills?

The list of questions may include more such questions. Questions rose above helps to formulate following statement of hypothesis i.e.
Hypothesis: There exists significant difference in perceived employability skills which contributes through syllabus and pedagogy, employability skills important to get an employment.

Types of Hypothesis:
Following are few types of hypothesis.

a. Working hypothesis:

Working hypothesis is formulated often in case of exploratory research. Since in exploratory research, researcher find it difficult to narrow the guess of possible phenomenon. Working hypothesis is framed first and then in due course of research stated working hypothesis is purified and restated. Working hypothesis is one which is provisionally accepted as a basis for further research in a hope that a tenable theory will be produced.

eg. Demographic factors and investment avenues are related.

Once study in direction of above mentioned hypothesis begins then it may unfold relationship between different demographic factors and range of investment avenues. In later part other types of hypothesis can be framed to put to test.

b. Descriptive Hypothesis:

This statement of hypothesis describes a behavior in terms of its particular characteristics, and/or situation in which it occurs.

eg. People working in government sector prefer to invest in tax savings investment avenues.

c. Relational Hypothesis:

This type of hypothesis attempt to establish the relationship between two variables.

eg.

- The more working hours in job, lower is the productivity

This hypothesis establishes relationship between working hours in job and its impact on productivity. Feature of this hypothesis is it is relational but directional. It shows that if one variable is going up then another is going down.

eg.
• Women are better than men. There is a relationship between gender and job-satisfaction/productivity.
This hypothesis is relational but non directional. Since relationship between gender and job satisfaction is given but it does not lead to any directions.

d. Correlation Hypotheses
The hypothesis explicitly states correlation between two variables said to be correlation hypotheses.
eg. There is positive correlation between Lectures attended and examination scores

e. Explanatory Hypotheses
Explanatory hypotheses is one wherein, claims are made that one variable causes other to occur.
eg. Elderly investors prefers to invest in safer investment avenues as compare to younger inventors prefer risky avenues

f. Null Hypothesis
Null hypothesis is very important from view point of testing of hypothesis since it is null hypothesis which is put to test.

The null hypothesis typically corresponds to a general or default position. It attempts to show that no variation exists between variables. The statement is presumed to be true until statistical evidence nullifies it for an alternative hypothesis.

Null hypothesis is a statement in which no difference or effect is expected. 

It states that there is nothing new happening, the old theory is still true, the old standard is correct and the system is in control.

g. Statistical Hypothesis
A statistical hypothesis is a statement about value of a population parameter (e.g., mean, median, mode, variance, standard deviation, proportion etc.
eg. The average of vehicle claimed by company is 70 Km. per liter. This can be tested whether the claim made by company withstands or not. Hence, statistical hypothesis framed as,
\[
\begin{align*}
H_0: \mu &= 70 \\
H_1: \mu &\neq 70
\end{align*}
\]
2.6 Check Your Progress

1. A research design is a ………………… specifying the methods and procedures for collecting and analysis the needed information.

2. Exploratory research design leads to develop ……………… type of hypothesis.

3. Descriptive research design refers to describing the ……………… of an individual or a group.

4. The principal of randomization is followed in ………………… research design.

5. The principal of local control is followed in ………………… research design.

6. A single unit is a part of study in ……………… type of research.

7. The relationship between variables is established in ……………… type of research.

8. It is the …………… hypothesis put to test.

9. A statement of hypothesis is an …………… to a research question.

10. Hypothesis as a possible explanation of the phenomenon under observation.

2.7 Summary

The most important document of research is research design. This is a blue print of research under study. Research design answers all W, H questions raised about research, like what the research is about, what to study, when to study, whom to study, how to study and the like. Only document researcher refers in any case of difficulty is research design.

Four research designs are exist those are, exploratory research design, descriptive research design, diagnostic research design and experimental research design. With respect to nature of research problem appropriate research design need to be executed. Good research design housed features like, reliability of data, less experimental error, yields more information, flexible to accommodate different issues related to problem under study and should be economical in utilizing the resources.

Every research is undertaken using appropriate type of research. Types prominently are experimental research, surveys, case studies, ex post facto research, action research, field investigation research, evaluation research and library research.
Central cord of any research is research question and answer given by researcher to said research question. Research question is taken from social or managerial issue or problem. And unbiased answer to research question is termed as null hypothesis. Research design is directed by research question and hypothesis. Sampling design, statistical design, operational design and observational design revolve around research question and hypothesis set to test for study.

2.8 Terms to Remember

• **Research Design:** Research design is a comprehensive document which navigates to researcher throughout research work. It is blue print of research voyage.

• A Research Design is a master plan specifying methods and procedures for collecting and analysis needed information.

• **Exploratory research design:** Exploratory Research Design refers to, Conducted as a preliminary step to clarify and define nature of a problem

• **Descriptive research design:** The Descriptive research designs enable researcher to describe or present pictures of a phenomenon or phenomena under investigation.

• **Diagnostic research design:** Diagnostic Research Design refers to, “Determining frequency with which something occurs or its association with something else.

• **Experimental research design:** Experimental research is designed to assess the effects of a particular variables on a phenomenon by keeping the other variables constant or controlled.

• **Features of good research design** – reliability of data, experimental error, information yields, flexibility and economical.

• **Types of research** – on the basis of application and on the basis of investigation.

• **Hypothesis:** Hypothesis as a possible explanation of phenomenon under observation.
• **Types of Hypothesis:** working hypothesis, descriptive hypothesis, relational hypothesis, correlation hypothesis, explanatory hypothesis, null hypothesis, statistical hypothesis.

### 2.9 Answers to Check Your Progress

1. Master Plan
2. Working
3. Characteristics
4. Experimental
5. Experimental
6. Case study
7. Ex-post facto research
8. Null
9. Answer
10. Phenomenon

### 2.10 Exercise:

1. What is research design? Give types of research design.
2. What are the types of research?
3. Define hypothesis, Explain the types of hypothesis.
4. Which are the steps involved in developing a research question?

### 2.11 Reference for Further Study:


Unit-3
Measurement Techniques and Data Collection

Structure
3.0 Objectives
3.1 Introduction:
3.2 Presentation Subject Matter
   3.2.1 The Concept of Measurement
   3.2.2 Functions or Purposes of Measurement
   3.2.3 Levels of Measurement
   3.2.4 Scaling Techniques
   3.2.5 Methods of Data Collection
   3.2.6 Data collection from Primary Sources
   3.2.7 Mailing Method/ Questionnaire Method
   3.2.8 Types of Questionnaire
   3.2.9 Types of Questions
   3.2.10 Interview Method
   3.2.11 Types of Interview
   3.2.12 Advantages of Interview Method
   3.2.13 Disadvantages of Interview Method
   3.2.14 Check your progress-I
   3.2.15 Schedule
   3.2.16 Types of schedule
   3.2.17 Questionnaire and Schedule
   3.2.18 Advantages of Primary Data
   3.2.19 Disadvantages of Primary Data
3.2.20 Data collection from Secondary Sources
3.2.21 Advantages of Secondary Data
3.2.22 Disadvantages Secondary Data
3.2.23 Check your progress-II

3.3 Summary
3.4 Answers to questions in 'Check your progress'
3.5 Key Terms
3.6 Exercises
3.7 References

3.0 Objectives:
After studying this Unit you will be able to:
1. Understand measurement and scaling techniques in the process of data collection.
2. Know methods of data collection including primary sources and secondary sources.
3. Understand the types of instruments for data collection such as questionnaire and schedule
4. Describe the advantages and disadvantages of mailing method, interview method and observation method.
5. Explain the advantages and disadvantages of primary data and secondary data.

3.1 Introduction:
In social science research we have to deal with various social and psychological variables. Their measurement is one of the vital stages in the research process. The measurement of social and psychological variables is a complex and demanding task. This section is devoted to discuss the meaning and nature of measurement, the need of measurement, its functions, the level of measurement, measurement process and validity and reliability of measuring instruments. This unit also includes the information about data collection and various sources of data collection.
Questionnaire and Schedule are the instruments of collecting data. Mailing, Interview, observation etc. are methods of data collection.

3.2 Presentation of Subject Matter:

3.2.1 The Concept of Measurement:

Measurement may be defined as the assignment of numerals to characteristics of objects, persons, state, or events according to rules. What is measured is not the object, person, state or event itself but some characteristic of it. For example, we do not measure the object itself but some characteristics of being present. We never measure people, only their age, height, weight, or some other characteristic. We can understand the meaning of 'measurement' in research in the following way:

1) Steven (1951) defines measurement as 'the assignment of numerals to objects or events according to rules.'

2) Campbell (1952) defines measurement as 'the assignment of numbers to objects to represent properties.'

3) Torgerson (1959) has defined measurement as 'the assignment of numbers to objects to represent amounts or degrees of a property possessed by all of the objects.'

Suppose, we want to conduct a study of persons who seek admission to M. Com. programme. In this study, one point of interest is to compute gender-wise percentage of applicants. After examining applications, we can map the observed properties into a gender classification. The rule of correspondence is: if the applicant is a male assign it '0' and if female, assign '1'. Any other symbol such as 'M' and 'F' may be assigned as number code are for identification only. Thus, measurement in its simplest form consists of assigning numerals or symbols to real objects and this process is called mapping. Numeral has no quantitative meaning unless one imputes to it such a meaning.

Numerals can be used to label objects like individuals, events or things. Numerals that are given quantitative meaning become numbers. With considering these numerals, the mathematical and statistical techniques can be used for purpose of description, explanation and prediction.
3.2.2 Functions or Purposes of Measurement:

Following are the functions or purposes of measurement which are not necessarily mutually exclusive but they are inter-related and complementary to each other (Krishnaswami and Rangnatham, 2011):

1. It facilitates empirical description of social and psychological phenomenon.
4. Measurement enables researchers to differentiate between objects or people.

3.2.3 Levels of Measurement:

Scales are devised for measuring variables in social science research. As the measurement is based on numbers, the properties of numbers are relevant to measurement which are as follows: (i) identity, (ii) rank order and (iii) additivity. There are three postulates basic to measurement which are:

(a) **Order:** Numbers are ordered. One number is greater than, less than, or equal to another.

\[ x > y \text{ or } x < y \text{ or } x = y \]

*if* \(x = y\) *and* \(y = z\), *then* \(x = z\)

*if* \(x = p\) *and* \(y = q\), *then* \(x +y = p + q\)

(b) **Distance:** Difference between numbers are ordered. The difference between any pairs or numbers is greater than, less than or equal to the difference between any other pair of numbers.

(c) **Origin:** The number series has a unique origin indicated by the number zero. When we combine the characteristics of order, distance and origin provide four levels of measurement: Nominal Scale, Ordinal Scale, Interval Scale and Ratio Scale.
Table 3.1

Levels of Measurement

<table>
<thead>
<tr>
<th>Levels</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Scale</td>
<td>No order, distance or origin</td>
</tr>
<tr>
<td>Ordinal Scale</td>
<td>Order, but no distance or origin</td>
</tr>
<tr>
<td>Interval Scale</td>
<td>Both order and distance, but no origin</td>
</tr>
<tr>
<td>Ratio Scale</td>
<td>Order, distance and origin</td>
</tr>
</tbody>
</table>

3.2.3.1 Nominal Scale: Nominal scale consists of two or more named categories into which the objects are classified. For instance, male-female, defective-non-defective. In nominal scale if numbers are used, then those are allotted purely arbitrary manner. Those numbers are just for identification purpose used in place of labels and those numbers are interchangeable.

3.2.3.2 Ordinal Scale: Ordinal scale of measurements gives numbers to groups of objects using some quantifiable characteristics. For example: group of individuals according to income such as poor, middle class, rich. In the ordinal scale, numbers given to groups as labels, serve the purpose of ranks. Hence labels are not interchangeable.

3.2.3.3 Interval Scale: This scale of measurement has equal units of measurement; however, the zero point is arbitrary. Centigrade scale used for measuring temperature is an interval scale and zero is arbitrary.

3.2.3.4 Ratio Scale: Ratio scale of measurement has equal units of measurement and those are taken from a true zero. Weight (kg), the scale 60kg wt is double heavy as compared to 30kg.

3.2.4 Scaling Techniques:

In social science research, for measuring attitudes researchers generally follow the technique of preparing questionnaire in such a way that the score of the individual person assign him a place on a scale. The scaling techniques can be used to find out social behaviour, approach and attitude of respondent towards research problem. Such scales may be classified into many techniques like: (1) Graphic
Rating Scale, (2) Comparative Rating Scale, (3) Itematized Rating Scales (4) Rank Order Scale, (5) Likert's Scale or Summative Scale, (6) Arbitrary scale, (7) Thurstone's Differential Scale and (8) Guttman or Cumulative Scaling. Some important scales are as follows:

3.2.4.1 Graphic Rating Scales: the respondent has to give a position or view point on a particular problem on a graph line which indicates both extremes. As graphs and figures are easy to grasp, graphic rating scales are applied in consumer survey, employee appraisal surveys and skill surveys etc. It requires an evaluator to indicate on a scale the degree to which an employee demonstrates a particular trait, behaviour or performance result. In this technique, whole system is very easy but the respondent can express his viewpoint to the nearest accuracy.

3.2.4.2 Comparative Rating Scale: Under this method, the respondent is required to compare certain aspects of the life of the people with whom he is closely associated or to whom he very well knows. Example- 1) We can ask a question like 'Do you feel that Mr. A is more honest in his dealings as compared with Mr. B. or 2) We can ask students a question such as 'Do you like A teacher more than B teacher'.

Where comparison is between more than two parties, we can give percentages. The respondents can select a certain percentage.

3.2.4.3 Itematized Rating Scales: This scale presents a series of statements (5 to 7) from which respondent selects one as best reflecting his evaluation. The statements are listed in graded manner. Definiteness linked with the need of the study and also on the nature of the material available for the study.

3.2.4.4 Rank Order Scale: It includes (a) method of paired comparison and (b) method of rank order. Under the method of paired comparison, the respondent can express his attitude by making a choice between two objects. The respondents are asked to rank their choices, under the method of rank order. It is difficult to rank the items when there are many items for ranking.

3.2.4.5 Likert's Scale or Summative Scale: Likert's scale is a popular method which allows the researcher to quantify items based on opinion. Questions are grouped together and rated or responded to, based on a five-point scale. It is a bipolar scaling method which measures either positive or negative response to a statement. Scale may be developed in the following forms:
First Example:

<table>
<thead>
<tr>
<th>Very interested</th>
<th>Somewhat interested</th>
<th>Unsure</th>
<th>Not very interested</th>
<th>Not interested at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Second Example:

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

3.2.4.6 **Arbitrary Scales**: Arbitrary scales are designed largely through the researcher’s own subjective selection of items. ‘An arbitrary scale is constructed by assigning arbitrarily numerical values to the responses to a set of questions appropriate to a given attribute. The values are summed up to secure the attribute scale’ (Krishnaswami and Rangnathom, 2009). For example, a college’s image among its students may be measured through the following items:

How do you regard your college’s reputation?

1. as a place of learning? Good…..Bad
2. as a source of guidance? Good…..Bad
3. as a provider of job opportunities Good…..Bad
4. for concern of student welfare? Good…..Bad

Each of these attributes may be scored from 0 to 4 according to the degree of favourableness reported. The total of scores of all respondents for each item may be made and studied. The overall image may also be studied by combining the scores of each respondent for the four items. As far as advantages of this technique are concerned, (a) it can be developed easily and quickly, (b) it is relatively less expensive, (c) it can be designed highly specific to contents of interests and (d) it is quite adequate. As far as disadvantages of this technique are concerned, it’s scoring is arbitrary and it is based on respondents’ subjective logic.

3.2.4.7 **Thurstone Differential Scales**: It is a differential scales or judgement scaling. Thurstone (1929) has made great contribution to attitude scale construction.
The selection of items is made by a panel of judges who evaluate the items in terms of whether they are relevant to the topic area and unambiguous in implication.

This scale consists of a number of statements whose position on the scale has been determined previously to be a ranking operation performed by judges. 3 to 7 point scale is used. The respondent is asked to make a (x) mark in the particular column against each statement, which best describes his feeling.

3.2.5 Methods of Data Collection:

‘Datum’ is singular whereas ‘Data’ is plural. In the research process, the collection of data is very important stage. If researcher does not carefully decide about various issues related to collection of data, he may create may hurdles himself.

If he takes proper precautions while collection of data, the analysis will be easier and comfortable as far as proper selection of statistical techniques are concerned. Sources of data can be classified into two types which are: (i) data collected from primary sources and (ii) data collected from secondary sources. We can say that the data can be treated as bases or raw material for analysis.

3.2.6 Data collection from Primary Sources:

This data are also called as primary data. Primary data are first hand data. Primary sources are original sources from which data are collected by any researcher yet nobody has collected the same data. Primary data can be collected through various methods such as (1) Mailing Method, (2) Interview method and (3) Observation method etc. However, in this unit, the first two methods have been covered.

3.2.7 Mailing Method/ Questionnaire Method:

Questionnaire is an instrument through which the data are collected by mailing it to respondents. It is nothing but a set of questions; the data are collected in the form of answers to such questions. It is prepared exclusively for the specific purpose. We can be familiar with the meaning of questionnaire after discussing following definitions:

1) **G. Lundburg** - “Fundamentally, the questionnaire is a set of stimuli to which illiterate people are exposed in order to observe their verbal behaviour under social stimuli.”
2) **Bogardus**—“A questionnaire is a list of questions sent to a number of persons for them to answer. It secures standardized results that can be tabulated and treated statistically.”

3) **Goode and Hatt**—“In general the word questionnaire refers to a device for securing answers to questions by using a form which respondent fills in himself.”

It is a set of questions which is sent to respondents and the investigator himself does not go to the informant for collecting information. The respondent returns it after filling answers to the questions. Then this data are used for research project.

### 3.2.8 Types of Questionnaire:

Forms of questionnaire may be broadly divided into two parts as structured questionnaire and unstructured questionnaire.

1) **Structured Questionnaire:** In structured questionnaire, questions are set in advance. It includes definite questions. According to P. V. Young, 'Structured questionnaires are those which pose definite, concrete and preordained questions, that is, they are prepared in advance and not constructed on the spot during the questioning period.' The forms of questions may require closed responses or open responses.

2) **Unstructured Questionnaire:** When pre-decided questions cannot serve the purpose of our research, the researcher frame out on the spot questions to get appropriate responses. In this case, questions are not set in advance.

3) **Open Form Questionnaire:** In this form, all open ended questions are asked. Here the respondent has freedom to give his own answer in detail. It provides greater depth of response.

4) **Close Form Questionnaire:** It is closed or restricted form of questionnaire. It provides selection of alternatives or ranking the items or checking an item from the list. The respondent has no freedom to elaborate his answer or stating reasons.

5) **Mixed Questionnaire:** It is a combination of close and open forms of questionnaires. It is more useful in social research. Here, characteristics of both forms are available.
6) **Opinion Questionnaire:** The opinion, attitude or preference regarding some phenomenon is sought through opinion questionnaire.

7) **Pictorial Questionnaire:** In this method, pictures are used to promote interest of respondents in answering questions. For answering the questions, alternative answers are given in the form of pictures and the respondent is required to tick mark any of them. It is more suitable if the respondents are illiterate or less educated.

### 3.2.9 Types of Questions:

There are different types of questions such as closed ended questions and open ended questions.

1) **Closed Ended Questions:** The answers to be given by respondents are made restricted to the certain alternatives. The respondents are required to select answer from such alternatives. Closed ended questions include dichotomous questions, multiple choice questions and scaled questions. It has limitation that the respondent cannot explain his views or reasons. Such questions are as follows:

(a) **Dichotomous Questions:** The questions where maximum two alternatives of answer are given those questions are called dichotomous questions. Example-'Yes' or 'No'.

**Dichotomous Question**

<table>
<thead>
<tr>
<th>Question</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have a bank account?</td>
<td>(i) Yes (ii) No</td>
</tr>
</tbody>
</table>

(b) **Multiple Choice Questions (MCQs):** In such type of questions, multiple alternatives of answer are given and respondent has to select one of them which is the most appropriate alternative. It is a popular type of closed ended question. Following is the example of MCQ.

**Multiple Choice Question**

'What is status of your business unit?'

(i) Micro enterprise (ii) Small enterprise (iii) Medium enterprise (iv) Large scale enterprise
(e) **Scaled Questions:** When responses are graded on a continuum, they are scaled questions. Likert scale, semantic differential scale and rank-order scale are examples of such scales.

<table>
<thead>
<tr>
<th>Likert Scale Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
</tr>
<tr>
<td>My manager provides constructive criticism</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semantic Differential Scale Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
</tr>
<tr>
<td>How do you rate your performance?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank Order Scale Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Price</td>
</tr>
<tr>
<td>(ii) Quality</td>
</tr>
<tr>
<td>(iii) Availability</td>
</tr>
<tr>
<td>When you select the product, rank what your priorities are.</td>
</tr>
</tbody>
</table>

2) **Open Ended Questions:** When options of answers are not given, they are called open ended question. Here the respondent has an opportunity to explain or elaborate answers. Such questions include completely unstructured questions, word association testing question, sentence completion question, story completion question, picture completion question and thematic appreciation test question etc.

3.2.10 **Interview Method:**

Interview is one of the methods of collecting data. Under this method, interview schedule is an instrument of collecting data. The investigator takes interview of respondents to seek answers to the questions formulated in interview schedule.

1) According to P. V. Young, “Interviewing is not a simple way to conversation between an interrogator and informant. Gestures, glances, facial expressions, pauses often reveal subtle feelings.”

2) Goode and Hatt have stated that “Interview is fundamentally a process of social interaction.”
3) As far as interview is concerned, Fred N. Kerlinger said that “The interview is face to face inter-personal situation in which one person, the interviewer asks a person being interviewed, the respondent, questions designed to obtain answers pertinent to research problems.”

4) According to P. V. Young, “It may be seen as an effective, informal, verbal, non-verbal, conversation, initiated for specific purposes and focused on certain planned content areas.”

5) About interview, Eckhardt and Ermann stated that “Interviewing is a data collection procedure involving verbal communication between the researcher and respondent either by telephone or in a face to face situation.”

   Interview is initiated by the investigator. It is a process completed by interviewer and interviewee. It is thus a system in which both the investigators as well as the informants discuss the problem under research. The objective of an interview is to collect information about unknown facts through face to face contacts. It is very important and popular method of collecting data for the purpose of research.

3.2.11 Types of Interviews:

   The interviews are classified into different types such as personal interview, group interview, formal interview, informal interview, diagnostic interview, treatment interview, research interview, qualitative interview, quantitative interview, mixed interview etc.

   1) **Personal Interview** : A single individual is interviewed in personal interview. It helps to establish personal contacts between the interviewer and the interviewee. Attitudes and changes in them are known by personal interview. The detailed knowledge about intimate and personal aspects are covered in personal interview.

   2) **Group Interview** : Here, two or more persons are interviewees. The aim of group interview is to gather routine information. This type of interview economizes both time and money. But the information to be gained may be very superficial and routine, as compared to other type.
3) **Formal Interview**: Here, the interviewer puts a set of well-defined questions and he notes down the answers given by the respondents. He follows the rules accordingly. It has formal interaction. But it is rigid.

4) **Informal Interview**: In this interview, the interviewer can alter the questions as per the requirement. He may revise the order of the questions to suit the needs of the respondents. It has flexibility. It is called informal interview.

5) **Qualitative Interview**: When the data are collected in qualitative from and it is regarding complex and non-quantifiable subject matter, this type of interview is suitable. In the purpose of case studies, qualitative interview is adopted to gather the information about past, present and future to know enough about individual case.

6) **Quantitative Interview**: It is the interview where certain set facts are collected about large number of persons. The interviews conducted for census are its examples.

7) **Mixed Interview**: It is generally free or unstructured interview. The interviewer merely engages the interviewee in talk and encourages him to tell about his experiences and feelings. The interviewer sums it up after the interviewee has discussed his experiences elaborately.

8) **Focused Interview**: It is adopted when a special concrete situation takes place. In case of which the concrete circumstances are analyzed already, it is possible to conduct such interview. It is conducted in the framework of field of inquiry and hypothesis. A particular attention is given towards the inner feelings and emotional attitudes of the interviewee. When specific issues are studied, personal reactions, emotional and intellectual orientation are covered by the focused interview.

9) **Repeated Interview**: This type of interview is suitable when we want to assess the development of processes and identify the factors influencing behaviour pattern.

10) **Diagnostic Interview**: When the interviewer tries to understand the cause of malady, this types of interview is adopted. To identify the causes of the disease, diagnostic interview of patient is taken.

11) **Treatment Interview**: When it is found that the cause of a psychological malady is non-physical, again interviews are conducted to bring to interviewee's
notice which cause of malady, either mental complex or faulty style of life. This type of interview is called ‘treatment interview’.

3.2.12 Advantages of Interview Method:

1) This method achieves high rate response participation. It has both inflow and outflow of ideas.

2) It helps in collecting information from the incapable like children or illiterate persons. In interview the interviewer can assist them to understand the question and to answer properly.

3) It helps in collecting information from the reluctant.

4) It is possible to go deep into the problem. It enables a trained and qualified interviewer to study the research problem much deeper.

5) The interviewer can crosscheck whether the information being collected is correct.

6) It is flexible as the interviewer can reframe the question if informant cannot understand it.

7) Emotions and fears can be appreciated while interviewing the informant and especially when he becomes emotional and excited.

8) Viewpoints of respondents are recorded by interviewer himself; therefore, the information collected will be most reliable.

9) Interview method can be used on all types of persons.

3.2.13 Disadvantages of Interview Method:

1) The interviewer has to meet every respondent, so it is costly method.

2) Due to different characteristics of every person, it is problem of validity and reliability measurement, when interview method is adopted.

3) The stress on specific aspect is given in research but this stress may be changed while interviewing respondent.

4) There is too much reliance on memory in interview method. The interviewer wants to collect data regarding many things so the collection is dependent on memory.
5) In interview method, too much reliance is on an individual who is expected to share his views-points, impressions and feelings.

6) The interviewer and interviewee have different world of discourse. They have different social philosophies so they may ascribe different values and meaning of social phenomenon.

7) The subjective nature of unstructured interview create problem that the data collected cannot be subject to statistical treatment.

8) It is difficult to find trained interviewers because everybody cannot take interview unless and until he has the skill of taking interview.

9) It is difficulty in persuading the interviewee for providing the information. It is possible only when he is confident.

3.2.14 Check your progress-I

Fill in the blanks and complete the sentence:

(a) ....................... is 'the assignment of numerals to objects or events according to rules'.

(b) ....................... is 'a list of questions sent to a number of persons for them to answer'.

(c) The ....................... data are those data which have been collected and used by the researcher.

3.2.15 Schedule

Schedule is a set of questions prepared for a certain research work but it is used for taking interview of the respondent. Here, the questions are required to be replied by the respondent with the help of an investigator. We can overview some definitions given below to understand the meaning of 'schedule'.

According to Thomas Carson Macormie, 'The schedule is nothing more than a list of questions which is seems necessary to test the hypothesis and hypotheses.'

Goode and Hatt said 'Schedule is the name of usually applied to a set of questions which are asked and filled in by the investigator in a face to face situation with another person.'
According to G. A. Lundberg, 'The schedule is device for isolating one element at a time thus intensifying our observation.'

C. A. Moser opined about schedule that 'Since it is handled by investigator it can be fairly formal document in which efficiency of field handling rather than attractiveness is the major operative consideration in design.'

Bogardus has defined the schedule as 'A schedule is a form of abbreviated questions which interviewer keeps with him and fills out as he proceeds with his enquiry.'

3.2.16 Types of Schedules:

There are various types of schedules such as observation schedule, interview schedule, rating schedule, document schedule and institutional survey schedule etc.

1) Observation Schedule: The investigator collects the information and simultaneously observes what the respondent is saying. This type of schedule is adopted when the researcher wants to verify the information already collected.

2) Interview Schedule: It may be used either for testing or collecting data. It is also used for collecting supplementary data. The interview is well structured due to the interview schedule. The investigator keeps this schedule with him while interviewing the respondent and he fills in the form of schedule.

3) Rating Schedule: In which schedule, the rating scales are used to assess the attitudes, opinions, preferences, inhibitions etc. Here, the value and trend of these qualities are measured by these scales.

4) Document Schedule: When investigator requires the data regarding written evidences and life histories, the document schedule is used. The terms are included in document schedules.

5) Institutional Survey Schedule: When the researcher wants to collect the data about specialized institutions or agencies, he uses institutional survey schedule for this purpose. The form and size of such schedule is dependent on the nature and the complexity of the problems of an institution.

3.2.17 Questionnaire and Schedule:

Both questionnaire and schedule are sets of questions for gathering data with certain specific objective of the research. However, they are different from each
The questionnaire is expected to be filled in by the respondent. So it should be more self-explanatory than the schedule. The schedule is filled in by the investigator or enumerator after getting answers to the questions. The questionnaire is indirect method whereas the schedule is direct method. By adopting questionnaires vast area of study can be covered. It is not possible in case of schedule as it is used to take interview. However, he can seek information on deep and serious problems.

**Table 3.2 Difference between Questionnaire and Schedule**

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is indirect method.</td>
<td>1. It is direct method.</td>
</tr>
<tr>
<td>2. It does not be suitable to face to face situation.</td>
<td>2. It is suitable to face to face situation.</td>
</tr>
<tr>
<td>3. It is filled in by respondent.</td>
<td>3. It is filled in by investigator.</td>
</tr>
<tr>
<td>4. It is used to collect the data by mailing method.</td>
<td>4. It is used to collect the data by interview method.</td>
</tr>
<tr>
<td>5. It is less expensive.</td>
<td>5. It is more expensive.</td>
</tr>
<tr>
<td>6. Non response is at high level in this method.</td>
<td>6. Non response is at low level in this method.</td>
</tr>
<tr>
<td>7. As the respondent does not return questionnaire immediately, the process is slow.</td>
<td>7. As the information collected and filled in by investigator, the process is fast.</td>
</tr>
<tr>
<td>8. It is useful only where respondent is literate.</td>
<td>8. It is useful even for illiterate respondent.</td>
</tr>
<tr>
<td>9. Misleading information may be collected by questionnaire.</td>
<td>9. It can collect more accurate information.</td>
</tr>
<tr>
<td>10. Success is dependent on quality of questionnaire.</td>
<td>10. Success is dependent on honesty and competence of investigator.</td>
</tr>
<tr>
<td>11. The identity of respondent is not known.</td>
<td>11. The identity of respondent is known.</td>
</tr>
<tr>
<td>12. The investigation with wide coverage is possible.</td>
<td>12. The investigation is restricted with the capacity of investigator to meet the respondents.</td>
</tr>
</tbody>
</table>
3.2.18 Advantages of Primary Sources of Data:

1. Fresh Data: Through primary sources a fresh data are collected as per the requirement of the study. A researcher can collect this data on the basis of definitions adopted by his own study. It is nothing but the first hand data.

2. Accurate Data: While collecting primary data, a researcher can maintain accuracy at appropriate level. He can avoid the circumstances which create errors in data collection of primary data. He can take precautions to collect the accurate data.

3. Reliable and Valid Data: The reliability and validity can be tested while collecting data or by pilot survey it can be tested. It is possible in case of primary data to collect reliable and valid data.

4. Easy Access: The primary data are collected direct from respondents and not from any other organization. So it is easy to collect it from them with easy access. In many types of collection of primary data, face to face interaction results into the data required.

5. Collection of suitable Data: The collection of primary data is nothing but creating a new dataset. So suitable data can be collected while collecting primary data considering objectives of the study.

3.2.19 Disadvantages of Primary Sources of Data:

1. Costly Data: More cost is required for collecting primary data. The researcher has to spend money for developing and mailing questionnaire, meeting respondents to take their interview etc.

2. Time Consuming: Sometime frequent meetings are required if the respondent is busy with his own work. It will take more time which increase the cost. As secondary data are readily available, primary data require more time because it is collected from field.

3. Difficult in Broader Scope: If the scope of the study is broader, it is highly impossible to collect primary data, in individual capacity of a researcher. For example collecting data from throughout the country.

4. Personal Limitations: A researcher as an individual has his own limitations as far as cost and time is concerned. Primary data can be useful source only if the collection of data is manageable to individual researcher.
5. Misleading Data: Sometimes called data may be misleading if answers are not properly filled in or the enumerator is not trained.

3.2.20 Data Collection from Secondary Sources:

Actually the secondary data are those data which have been collected by somebody else but used by the researcher. He can analyses such data and present the results. The documentary sources are treated as secondary sources of data. These documents can be classified into two parts: Personal documents and public documents.

Personal Documents are: (1) Life History, (2) Diaries, (3) Letters, and (4) Memories. Public Documents are divided into two categories: (1) Published documents and (2) Unpublished documents. The unpublished documents include: (a) proceedings of meetings, (b) nothing on the files and memoranda, (c) annual reports, (d) unpublished dissertations and theses etc. In this case internal sources are not made public and people in such organization are reluctant to provide such data to researchers. The published documents consist of: (a) survey, (b) reports, (c) books, (d) journals etc. Such data are readily available to researchers.

It means the primary data collected by one person becomes secondary data for another person. The Government of India conducts census survey once after regular interval of 10 years. This is primary data for the Government but secondary data for others.

3.2.21 Advantages of Secondary Sources of Data:

1. Quick and Cheap: Secondary data are readily available as it is collected by someone else. Once their source of documents and reports are identified, collection of data is just a matter of desk work. The researcher can access data quickly and cheaply.

2. Coverage of Wider Scope: Without much cost, longer reference period and geographical scope can be covered if secondary data is option for researcher.

3. Generalization Possible: The database is broadened by secondary data through which generalization is possible scientifically.

4. Supporting Verification: The secondary data may be used as support to verify the findings based on the primary data.
3.2.22 Disadvantages of Secondary Sources of Data:

1. **Non-suitability:** Our needs may not meet with the available data because there may be difference between the definition adopted by those who have collected the data and meaning expected by us. In such case the available data may be not suitable.

2. **Inaccuracy:** The desired accuracy may not be available in secondary data. We have to know how data were collected by them, then it may be possible to assess the accuracy. But it is not possible in many situations.

3. **Outdated Data:** The secondary data may not be up-to-date and become obsolete because of time lag required to publish it. Population census data are published three or four years later after compilation and afterwards no few figures would be available for next ten years.

4. **Non-accessible Data:** What type of data the social scientist require, may not be available easily. The accessibility depends primarily on proximity. Sometime the organizations are reluctant to avail the data to the researchers.

5. **Difficult to test Reliability and Validity of Data:** In which situation the data have been collected is not known. So it is difficult to test reliability and validity of secondary data.

3.2.23 Check your progress-II

State whether the following statement is true or false:

(a) Schedule is a set of questions prepared for a certain research work but it is used for taking interview of the respondent.

(b) The annual report is a primary source of data.

(c) The option of secondary data is more costly than primary data.

3.3 Summary

This section is devoted to discuss the meaning and nature of measurement, the need of measurement and its functions, the levels of measurement, measurement process and validity and reliability of measuring instruments. This unit also includes the information about data collection and various sources of data collection.
Questionnaire and Schedule are the instruments of collecting data. Mailing, Interview, observation etc. are methods of data collection.

The measurement means the assignment of numerals to characteristics of objects, persons, state, or events according to rules. Nominal scale, Ordinal scale, Interval scale and Ratio scale are four levels of measurement. The scaling techniques can be used to find out social behaviour, approach and attitude of respondent towards research problem. Such scales may be classified into many techniques like: (1) Graphic Rating Scale, (2) Comparative Rating Scale, (3) Itematized Rating Scales (4) Rank Order Scale, (5) Likert's Scale or Summative Scale, (6) Arbitrary scale, (7) Thurstone's Differential Scale and (8) Guttman or Cumulative Scaling. Primary sources are original sources from which data are collected by any researcher yet nobody has collected the same data. Primary data can be collected through various methods such as mailing, interviewing and observation etc. A questionnaire is list of questions sent to a number of persons for them to answer. It secures standardized results that can be tabulated and treated statistically. The interview schedule is an instrument of collecting data. The investigator takes interview of respondents to seek answers to the questions formulated in interview schedule. The secondary data are those data which have been collected by somebody else but used by the researcher. It also elaborates types of questionnaire, types of interview, types of questions and difference between questionnaire and schedule etc. Advantages and disadvantages of primary data as well as secondary data are described in this unit.

3.4 Answers to questions in 'check your progress'

Answers to questions in 'Check your progress-I':

(a) Measurement, (b) Questionnaire (c) primary

Answers to questions in 'Check your progress-II':

(a) True, (b) False (c) False

3.5 Key Terms

1. Measurement : The measurement means the assignment of numerals to characteristics of objects, persons, state, or events according to rules. Nominal scale, Ordinal scale, Interval scale and Ratio scale are four levels of measurement.
2. **Primary Data**: Primary sources are original sources from which data are collected by and researcher yet nobody has collected the same data. Primary data can be collected through various methods such as mailing, interviewing and observation etc.

3. **Secondary Data**: The secondary data are those data which have been collected by somebody else but used by the researcher.

4. **Questionnaire**: A questionnaire is list of questions sent to a number of persons for them to answer. It secures standardized results that can be tabulated and treated statistically.

5. **Schedule**: The interview schedule is an instrument of collecting data. The investigator takes interview of respondents to seek answers to the questions formulated in interview schedule.

6. **Interview**: The interview is fact to face inter-personal situation in which one person, the interviewer asks a person being interviewed, the respondent, questions designed to obtain answers pertinent to research problems.

3.6 **Exercise**

1. Write long answers to the following questions.
   
   (a) Describe various scaling techniques.
   
   (b) What is primary data? Describe the advantages and disadvantages of primary data.
   
   (c) What is secondary data? Describe advantages and disadvantages of secondary data.

2. Write short answers to the following questions:
   
   (a) What is a measurement? Explain various levels of measurement.
   
   (b) What is questionnaire? Explain the types of questionnaire.
   
   (c) What is schedule? Explain the types of schedule?
   
   (d) Distinguish between questionnaire and schedule.

3. Write short notes on:
   
   (a) Primary data
   
   (b) Secondary data
(c) Questionnaire
(d) Schedule
(e) Interview
(f) Open ended questions
(g) Closed ended questions

3.7 References:


4.0 Objectives:

Present unit helps to understand concept sampling. The way samples are selected and various types of sampling in social sciences in general and management science in specific.

4.1 Introduction:

Sampling decisions are very crucial but even important in social science research. The subject of social science research is human being and the size of population of this subject is generally very large. Hence, the study of social sciences is rest on sampling. Selection of representative sample is one of key of success. Since the output received from samples in the form of opinions represents the entire population under study.
4.2 Presentation of Subject Matter

This chapter on 'sampling' is mainly designed to provide the meaning of sampling in research, types of sampling and guides to get the idea of population and how to decide sample size. As well as it provides the knowledge of good sampling and sampling adequacy to the beginners in research.

Definition of Sampling:

Various definitions of sampling are put forth by scholars few to mention here are:

The term sample should be reserved for a set of unit or portion of an aggregate and material which has been selected in the belief that it will be representative of the whole aggregates. - Frank Yates

“A Sample may be defined as a part of population which selected and examined for estimating the quality of the population.” – Sharma A. (2006)

“A Sample is a collection of observations representing only a portion of the population.” Lapin L. L. (1973).

“A sample as the name implies is smaller representative of a larger whole.” - William J. George and Paul K. Hatt

“A statistical method is a miniature picture or cross section of the entire group or aggregate from which the sample” - P.V. Young

Above definitions of sampling reveals that the sample is representative portion or section of entire population under study.

Say for example if researcher wishes to study the worth of MBA distance program offered by Shivaji University, for employability. The number of students passed out last year from MBA distance program is say example 1000 students. It is difficult to approach these entire 1000 pass out students to understand their opinions on the employability of distance mode MBA course. In such case appropriate size of samples would be decided first and then it is decided how the samples to be approached, it means deciding on type of sampling.

Population and Sampling:

Population: the term population and universe are used interchangeably.
Population consists of whole set of data or information from the entire universe, which is considered to be the whole source of information.

The population is of two natures one is finite and second is infinite. Finite population where the elements in the population can be countable and the infinite population mean elements in population cannot be countable.

Sampling frame is a defined part of a population. Say for example a topic like study of quality of work life of working men. Now question arises is men in India or Maharashtra or from any defined geography. Another aspect is working men indulge into service sector, trading sector and entrepreneurship. Independent sectors are very large in scope, like service sector encompasses banking, insurance, post, education, telecommunication, BPO, KPO, information technology and the like.

After going through the multilevel process researcher reaches to a final list of samples and a sampling element.

Entire efforts of sampling are to select the best appropriate representative sample which could better the estimate characteristics or behaviour of the population.

Picture above shows that out of bunch of population few handfuls of samples are taken. Results drawn from samples are then generalized to population. Hence, representativeness of sampling is pivotal.

Statistically capital letter ‘N’ is denoted to know the population and small letter ‘n’ is denoted to know sample.
Types of Sampling:

<table>
<thead>
<tr>
<th>RANDOM SAMPLING</th>
<th>NON RANDOM OR JUDGEMENT SAMPLING</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Simple random sampling</td>
<td>- Quota sampling</td>
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<tr>
<td>- Stratified random sampling</td>
<td>- Convenience sampling</td>
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<tr>
<td>- Systematic sampling</td>
<td>- On the spot sampling</td>
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<tr>
<td>- Sequential sampling</td>
<td>- Snow ball sampling</td>
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<tr>
<td>- Multi stage sampling</td>
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**Random Sampling:** it is also termed as probability sampling. It is known as random or probability sampling since every item in the population has a chance of being selected as a sample. Against it,

**Non random:** also termed as judgment sampling. In this case possibility of being selected as a sample is judged on the basis of personal knowledge, opinion, interest etc. of researcher. Hence, entire population may not get an equal opportunity for being selected as a sample.

**Random Sampling Methods:**

A. **Simple random sampling:** “simple random sampling selects samples by methods that allow each possible sample to have an equal probability of being picked and each item in the entire population to have an equal chance of being included in the sample.”

Samples are drawn at random from population in a simple way the probability that each unit of population will be selected is equal i.e. 1/N where N is total population. Probability of second draw is 1/N-1 and so on.

Methods of simple random sampling

1. **Lottery Method** – this is most popular method due to its simple execution. Numbers or names of samples are written on independent chits. Chits are to be
poured in drum and mix it well. Desired numbers of chits are to be taken out as sample for study.

2. **Random number** – books of arranging random numbers like tippet book are available which are constructed a list of four to seven-digit numbers written at random. eg. If 150 persons are to be selected for study out of the total number of 5000 then one can open any page to such book numbers and select first 150 that are below 5000 and take them up for study. Or take first three digits of numbers in the list given.

3. **Selection from sequential list** – names are arranged serially according to a particular order. Order may be alphabetically, geographically or only serial. Then out of list any number may be taken up. Beginning of selection may be made from anywhere. Every 10\(^{th}\) or any other relevant value may be taken up.

**Advantages**

1. It is quite simple
2. The selection is free from bias
3. More representatives because each unit has equal chance of being selected.
4. Easy to detect errors.

**Disadvantages**

1. Selection according to strictly random basis is not possible
2. Lack of control of the investigator
3. Random sampling does not suit heterogeneous groups.

B. **Stratified random sampling:** the universe or entire population is divided into a number of strata or group so it is named as stratified sampling. Once whole universe is divided into various groups certain numbers of, items are taken from each group at random.

**Types** –

1) **Proportionately stratified sampling** - the number of units should be drawn from each unit of strata is in the same proportion as it is in the universe.
2) **Disproportionate stratified sampling**: an equal number of cases are taken from each stratum without any consideration to the size of strata.

C. **Systematic sampling**: the first unit is drawn at random from the selected class interval and the remaining units are systematically and purposively drawn. eg. The size of the population (N) is 500, and the size of the sample (n) is 50; then the proportion of the sample would be \(\frac{N}{n}=10\). The first unit may be chosen at random from the first interval i.e. 1-10. Suppose the first unit drawn is 5, then the second would then be \(5+10=15(5+K)\), where \(K\) stands for \(\frac{N}{n}\); the third sample would be \(5+K+K\) i.e. \(5+2K=25\).

Purposive selection aims at gaining the most representative sample that possesses the qualities of the entire universe.

D. **Sequential sampling**: the process of selecting a small number of samples from a large population. Generally used in industrial tests. Statistical quality control of finished products. In a pharmaceutical company, small samples are drawn from each batch in a sequential manner to test the quality in which case sequential sampling is useful.

E. **Multi stage sampling (cluster sampling)**: the selection of sample is made in different stages. The selection is made in different stages so called multi stage sampling. This method is used when the universe is very large area.

    eg. Study the migrated labour in sugar industry of Maharashtra.

    i. Prepare list of district where sugar factories are in existing. And select randomly few districts for study.

    ii. Prepare list of sugar factories from the selected district. And select randomly few sugar factories for study.

    iii. Prepare list of all migrated labour from selected sugar factors. Suppose the list of labour is 1000.

    iv. Select randomly number of labour to be studies. eg. 10% or 20% etc.

Non Random Sampling Methods:

F. **Quota sampling**: special form of Stratified Sampling. Once stratum has been divided into various units then we decide number is to be selected from each stratum.
G. **Convenience sampling:** sample is drawn according to one’s own convenience without any systematic method it is known as convenience sampling. e.g. Pilot testing.

Though result may not be accurate, it may throw light on some important aspects of the study.

H. **On the spot sampling:** sometimes some persons opt for their own inclusion or non-inclusion in the sample units. In this case, researcher may select such samples on the spot. Sometimes samples, which are selected, may not be available, on the spot sample would then be substituted.

I. **Snow ball sampling:** in snowball sampling researcher identifies one sample from the population, interview the sample for the purpose of researcher and at the end ask for other person in the population he knows and researcher can talk to. Snow ball is used when the population is scattered and niche in nature. For example researcher wishes to know the quality of life of drivers working on excavators. The excavators are limited in numbers and the ready list of existing drivers working on excavators may not be available. In such case snow ball sampling is useful.

**Features of Good Sampling:**

1. **Representative Character:** very important feature of sampling is, it must be representative of population. Since the samples are taken from population they are expected to be representative but the way samples selected makes difference as far as representative character is concerned.

2. **Small sampling error:** Sample design must be such which results in a small sampling error.

3. **Adequate number of samples:** entire study is governed by the representative units. Since the opinions are very subjective in social sciences it is necessary that their number should be adequate.

4. **Economic Viability:** Sample design must be viable in the context of funds available for the research study.
5. **Selection free from bias:** Sample design must be such so that systematic bias can be controlled in a better way.

6. **Results applied to universe:** Sample should be such that the results of the sample study can be applied, in general, for the universe with a reasonable level of confidence.

**Sampling Adequacy:**

Important quest in sampling is determination of appropriate size of samples. Statistically minimum size of sample is termed to be 30. Various scholars have proposed different statistical formulae on calculation of sample size. Two widely used formulae are as follows.

Since it has mentioned above in this unit that population has of two natures one is finite and another is infinite. Since the type of selection of sample is related with nature of population. The same way selection of appropriate formulae is related with nature of population. Following two formulae are given one is applicable to finite population and another is for infinite population.

**Formula for finite population:**

Following is the formula widely used in calculation of sample when population is finite i.e. countable. For example, number of students studying in MBA in institutes affiliated to Shivaji University. Or number of girls studying in MBA came from rural area. In such cases population is countable and to conduct the research using following formula sample size can be decided.

\[ n = \frac{N}{1+N(e)^2} \]

Where ,

- \( n \) = sample size
- \( N \) = Size of population
- \( e \) = tolerable sampling error
Say for example 850 students are admitted to distance MBA and researcher wish to know the perceptual quality of MBA course material i.e. (SIM) from the students then using above formula sample size is calculated as follows.

Tolerable sampling error is assumed to be 5%

\[ n = \frac{850}{1+850(0.05)^2} \]

\[ n = 272 \]

So the adequate sample size calculated using stated formula is 272.

Formula for infinite population:

Following formula is used to calculate sample size when population is infinite. Say for example researcher wish know the perception of citizens about MBA distance course in Kolhapur. It is very difficult to get exact population of Kolhapur city that to population which termed as major population. In such cases following formula may bring in use.

\[ n = \left( \frac{Zs}{e} \right)^2 \]

Where,

\( n \) = sample size

\( Z \) = the desired level of significance (confidence level)

\( S \) = standard deviation

\( e \) = tolerable sampling error

The assumed tolerable sampling error is 5% and the standard deviation is 0.66. at 5% level of error the value of ‘Z’ should be taken at 95% confidence level i.e. 1.96.

So plugging the above figures in given formula yields,

\[ n = \left( \frac{1.96 \times 0.66}{0.05} \right)^2 \]

\[ n = 669.36 \]
rounded off to 670

So the adequate sample size calculated using stated formula is 670.

4.3 Check your progress

1. The term population and ............... are used interchangeably.
2. Sample is smaller ...............of a larger whole.
3. Statistically minimum size of sample is termed to be ............... 
4. The population is of two natures one is ............ and second is infinite.
5. Sampling frame is a defined part of a ............... 
6. The letter ........... is denoted to know the population and letter ........ is denoted to know the sample.
7. Sample is ........... of population.
8. Results of sampling are applied to ............... 
9. In sampling calculation formula ‘e’ refers to ............... 
10. Random sampling methods are also known as ............... 

4.4 Summary:

Besides many decisions in social science research, sampling decisions are crucial and even important. Unlike in physical sciences only one sample can be an exact representative of population, for example a drop of blood in human body is exact representative of entire blood in human body. This is not possible in social sciences since the experiences, attitude and behaviour of people differs. It differs in different contexts and situations as well. So selecting an appropriate representative of sampling is a quest. The larger sample size is better representative of population, but may leads to sampling error and also consumes more resources whereas smaller sampling may not be better representative of population. Using the formulae the size of samples can be decided to avoid possible sampling errors.
4.5 Terms to Remember

- **Sampling:** A statistical method is a miniature picture or cross section of the entire group or aggregate from which the sample” - P.V. Young

- **Population:** Population consists of whole set of data or information from the entire universe, which is considered to be the whole source of information.

- **Sampling frame:** Sampling frame is a defined part of a population.

- **Random Sampling:** every item in the population has a chance of being selected as a sample.

- **Non random:** samples are judged on the basis of personal knowledge, opinion, interest etc. of the researcher.

4.6 Answers to check your progress

1. Universe
2. Representative
3. 30
4. Finite
5. Population
6. ‘N’, ‘n’
7. Representative
8. Universe/Population
9. Tolerable Sampling Error
10. Probability sampling

4.7 Exercise

1. Define Sampling, Sample and Population.
2. What are the types of sampling?
3. Explain the features of good sampling.
4. How the sample size is determined?
5. Undertake any research problem. Consider the type of population and calculate the adequacy of sample size using appropriate formula.

6. Study the research articles in the area of your interest. Study how the respective researcher has selected the sample (type of population, sampling method and size of samples) for respective study.

4.8. Reference for Further Study:


