
UNIT 2 RESEARCH PLAN

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2.0 OBJECTIVES

After studying this unit, you should be able to:

- 1 Select a research problem and identify sources of research problem,
- 1 define and specify a research problem,
- 1 explain the need for formulating research objective(s),
- 1 define hypothesis and classify the hypotheses,
- 1 suggest a criteria for a good hypothesis,
- 1 test a hypothesis,
- 1 describe a research design,
- 1 list out the components of a research design, and
- 1 distinguish between a pilot study and pre-test.

2.1 INTRODUCTION

In unit 1, we have discussed the meaning and significance of business research, types of research, methods of conducting research, and the business research process. There we have shown that the research process begins with the raising of a problem, leading to the gathering of data, their analysis and interpretation and finally ends with the writing of the report. In this unit, we propose to give a complete coverage on selection and specification of the research problem, formulation of research objectives / hypotheses and designing the action plan of research. Now we will dwell in detail on these aspects along

with the associated features which are interwoven with the research problem and hypothesis formulation and testing.

2.2 RESEARCH PROBLEM

Without a problem, research cannot proceed, because there is nothing to proceed from and proceed towards. Therefore, the first step in research is to perceive a problem - either practical or theoretical. The recognition or existence of a problem motivates research. It may be noted that research is the process of repeated search for truth/facts. Unless there is a problem to search for, investigation cannot proceed. Thus, a problem sets the goal or direction of research.

A problem in simple words is “some difficulty experienced by the researcher in a theoretical or practical situation. Solving this difficulty is the task of research”.

A problem exists when we do not have enough information to answer a question (problem). The answer to the question or problem is what is sought in the research.

By problem we mean “any condition or circumstance in which one does not know how to act and what to accept as true”. In our common usage when we are unable to assess a thing correctly, we often say ‘it is problematic’. Thus the researcher who selects a problem formulates a hypothesis or postulates a theoretical assumption that this or that is true, this or that thing to do. He/she collects proof (facts/data) of his/her hypothesis. Based on the analysis of the data collected he/she asserts the truth or answers the question/solves the problem.

The problem for research should ordinarily be expressed in an interrogative form. For example :

- Why is product X more popular than product Y?
- How to increase labour productivity?
- Does illumination increase productivity?
- Why is factory A earning profits and factory B incurring losses?
- Is the audio-visual system of teaching more effective than the audio system?

These are all searchable problems/questions. Finding answers to the problems is what is endeavoured in research. One question/problem may give rise to number of/series of sub-questions too.

Let us, now, discuss some considerations for selection of a research problems.

A topic of study may be selected by some institution or by some researcher or researchers having intellectual interests. In the former case there could be a wide variety of problems in which institutions are interested. The institution could be a local body, or government or corporate enterprises or a political party. For example, the government may be interested in assessing the probable consequences of various courses of action for solving a problem say rural unemployment. A firm may be interested in assessing the demand for something and predicting the future course of events so as to plan appropriate action relating to marketing, production, consumer behaviour and so on.

The topic of study may be selected by some individual researcher having intellectual or scientific interests. The researcher may be interested in exploring some general subject matter about which relatively little is known. And its purpose is just for scientific curiosity. Person may also be interested in a phenomenon which has already been studied in the past, but now it appears that conditions are different and, therefore, it requires further examination. Person may also be interested in a field in which there is a highly developed theoretical system but there is need for retesting the old theory on the basis of new facts, so as to test its validity in the changed circumstances.

The topic of research may be of a general nature or specifically needed by some institution, organization or government. It may be of intellectual interest or of practical concern, "A wide variety of practical concerns may present topics for research". For example, one may want to study the impact of television on children's education, performance of regulated agricultural markets, profitability of a firm, impact of imports on Indian economy, a comparative study of accounting practices in public and private undertakings, etc.

2.2.1 Sources of Research Problems

If the researcher / research organization has a ready problem on hand, he/she can proceed further in the research process or else you have to search for a problem. Where can you search for research problems? Your own mind, where else? You have to feel the problem and think about it. However, the following sources may help you in identifying the problem / problem areas.

1) **Business Problems:** A research problem is a felt need, the need may be an answer, or a solution or an improvement in facilities / technology eg. Cars Business experiences, various types of problems. They may be business policy problems, operational problems, general management problems, or functional area problems. The functional areas are Financial Management, Marketing Management, Production Management and Human Resources Management. Every business research problem is expected to solve a management problem by facilitating rational decision-making.

2) **Day to Day Problems:** A research problem can be from the day to day experience of the researcher. Every day problems constantly present some thing new and worthy of investigation and it depends on the keenness of observation and sharpness of the intellect of the researcher to knit his daily experience into a research problem. For example, a person who travels in city buses every day finds it a problem to get in or get out of the bus. But a Q system (that is the answer to the problem) facilitates boarding and alighting comfortably.

3) **Technological Changes:** Technological changes in a fast changing world are constantly bringing forth new problems and thus new opportunities for research. For example, what is the impact or implications of a new technique or new process or new machine?

4) **Unexplored Areas:** Research problems can be both abstract and of applied interest. The researcher may identify the areas in which much work has been done and the areas in which little work has been done or areas in which no work has been done. He may select those areas which have not been explored so far/explored very little.

5) **Theory of One's Own Interest:** A researcher may also select a problem for investigation from a given theory in which he has considerable interest. In such situations the researcher must have a thorough knowledge of that theory and should be able to explore some unexplained aspects or assumptions of that theory. His effort should revalidate, or modify or reject the theory.

6) **Books, Theses, Dissertation Abstracts, Articles:** Special assignments in textbooks, research theses, investigative reports, research articles in research journals etc., are rich sources for problem seekers. These sources may suggest some additional areas of needed research. Many of the research theses and articles suggest problems for further investigation which may prove fruitful.

7) **Policy Problems:** Government policy measures give rise to both positive and negative impact. The researcher may identify these aspects for his research. For example, what is the impact of the Government's new industrial policy on industrial development? What is the impact of Export - Import policy on balance of payments? What is the impact of Securities Exchange Board of India Regulations on stock markets?

8) **Discussions with Supervisor and Other Knowledgeable Persons:** The researcher may find it fruitful to have discussions with his/her proposed supervisor or other knowledgeable persons in the area of the topic.

Self Assessment Exercise A

Fill up the blanks with appropriate words

- 1) A research problem is a need.
- 2) The problem sets the of research.
- 3) The research problem should preferably be expressed in form.
- 4) A problem exists when we do not have enough to answer it.
- 5) Technological changes are a constant for research.
- 6) List five research problems on your own.

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2.2.2 Points to be Considered while Selecting a Problem

The topic or problem which the researcher selects among the many possibilities should meet certain requirements. Every problem selected for research must satisfy the following criteria.

1) The topic selected should be original or at least less explored. The purpose of research is to fill the gaps in existing knowledge or to discover new facts and not to repeat already known facts. Therefore, a preliminary survey of the existing literature in the proposed area of research should be carried out to find out the possibility of making an original contribution. Knowledge about previous research will serve at least three purposes.

- a) It will enable the researcher to identify his specific problem for research.
 - b) It will eliminate the possibility of unnecessary duplication of effort, and
 - c) It will give him valuable information on the merits and limitations of various research techniques which have been used in the past.
- 2) It should be of significance and socially relevant and useful.
 - 3) It should be interesting to the researcher and should fit into his aptitude.

- 4) It should be from an area of the researcher's specialization.
- 5) It should correspond to the researcher's abilities - both acquired and acquirable.
- 6) It should be big enough to be researchable and small enough to be handled - the topic should be amenable for research with existing and acquirable skills.
- 7) It should have a clear focus or objective.
- 8) The feasibility of carrying out research on the selected problem should be checked against the following considerations.
 - a) Whether adequate and suitable data are available?
 - b) Whether there is access to the organization and respondents?
 - c) Whether cooperation will be forthcoming from the organization and respondents?
 - d) What are the resources required and how are they available?
 - e) Whether the topic is within the resources (money and man power) position of the researcher?
- 9) It should be completed within the time limits permissible.

2.2.3 Specification of the Problem

After going through all the above issues a problem is to be restated in an analytical jargon keeping in view its solution. The best way of understanding the problem is to discuss it with those who first raised it in order to find out how it originally came up and what was in the minds of the people who raised it. The more general the original statement of the problem, the more the necessity of preliminary discussions about its nature.

The research problem should define the goal of the researcher in clear terms. It means that along with the problem, the objective of the proposal should adequately be spelled out. Without a clear cut idea of the goal to be reached, research activities would be meaningless.

The first step in the formulation and specification of a research problem is to make it concrete and explicit. There is no foolproof method by which one can do it. However, R.L. Ackoff provides considerable guidance in identifying and specifying a problem of research. He presents five components of a problem.

1) **Research Consumer:** There must be an individual or a group which has difficulty. The individual may be the researcher himself and the group / a group of researchers. For some problems there are also other participants. The researcher, if he/she is different from the research consumer, is a participant in the problem.

2) **Research-Consumer's Objective:** The research consumer must have something to know or some ends to achieve. Obviously, a person who wants nothing cannot have a problem.

3) **Alternative Means to Achieve the Objective:** The research consumer must have alternative means to achieve his objectives. Means are courses of action. A course of action may involve the use of objects. The objects used thus are instruments. Here an instrument refers to any object, concept or idea which can be effectively used in the pursuit of an objective.

It should be remembered that there must be at least two means available to the research consumer. If he/she has no choice of means, he/she cannot have a problem.

4) **Doubt in Regard to Selection of Alternatives:** The existence of alternative courses of action is not enough. To experience a problem, the research consumer must have some doubt as to which alternative to select. Without such a doubt there can be no problem. All problems then get reduced ultimately to the evaluation of efficiency of the alternative means for a given set of objectives.

5) **One or More Environments:** There must be one or more environments to which the difficulty or problem pertains. A problem may exist in one environment and may not in another. Thus a change in environment may produce or remove a problem. A research consumer may have doubts as to which will be the most efficient means. The strategy of marketing a product may be different in the urban market, the semi-urban market and the rural market. The instruments of spreading the family planning message may be different in the case of educated and illiterate people. The range of environments over which a problem may exist may vary from one to many. Some problems are specific to only one environment while others are quite general.

The selection of a topic for research is only half-a-step forward. This general topic does not help a researcher to see what data are relevant to his/her purpose. What are the methods would he/she employ in securing them? And how to organize these? Before he/she can consider all these aspects, he/she has to formulate a specific problem by making the various components of it (as explained above) explicit.

A research problem is nothing but a basic question for which an answer or a solution is sought through research. The basic question may be further broken down into specifying questions. These “simple, pointed, limited, empirically verifiable questions are the final result of the phased process, we designate as the formulation of a research problem”. Specification or definition of the problem is therefore a process that involves a progressive narrowing of the scope and sharpening of focus of questions till the specific challenging questions are finally posed. If you can answer the following questions, you have clearly specified/defined the problem.

- 1) What do you want to know? (What is the problem / what are the questions to be answered).
- 2) Why do you want to know? (What is the purpose or objective).
- 3) How do you want to answer or solve it? (What is the methodology we want to adopt to solve it)
- 4) When do you want to solve it? (Within what time limits)
- 5) Where do you want to solve it? (Within what spatial limits)
- 6) Who is your research-consumer? (to whom are you answering)

Please remember that a problem well put is half solved.

2.3 FORMULATION OF OBJECTIVES

Having selected and specified the research problem, the next step is to formulate the objectives of research. Research is not for the sake of research. It is undertaken to achieve some thing. Thus, research is a goal-oriented

activity. We have to identify the goal / goals to be achieved and they must be specified in order to give direction to the research study. Hence, formulation of research objectives is equally important. Once research objectives are stated, then the entire research activity will be geared to achieving those objectives. For example, we intend to examine the working of a Regulated Agricultural Market in a town to know whether it is fulfilling the objectives for which it has been set up. For this study, we will gather all the relevant information/data such as arrivals of different commodities, sources and uses of funds, facilities provided in the market, users opinions etc. Similarly, if we are clear about what we want from the research exercise, then the rest of the things will depend upon the objectives such as identifying sources of data, instruments of collection of data, tools of analyzing data. However, the objectives of the study must be clear, specific and definite.

Self Assessment Exercise B

- 1) List any five points which will weigh in selecting a problem.

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- 2) What do you mean by specification of a problem?

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- 3) What is the need for formulation of objectives of research?

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- 4) How do day-to-day problems give rise to research?

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- 5) What is the need for knowledge about previous research?

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2.4 HYPOTHESIS

We know that research begins with a problem or a felt need or difficulty. The purpose of research is to find a solution to the difficulty. It is desirable that the researcher should propose a set of suggested solutions or explanations of the difficulty which the research proposes to solve. Such tentative solutions formulated as a proposition are called **hypotheses**. The suggested solutions formulated as hypotheses may or may not be the real solutions to the problem. Whether they are or not is the task of research to test and establish.

2.4.1 Meaning of Hypothesis

To understand the meaning of a hypothesis, let us see some definitions:

“A hypothesis is a tentative generalization, the validity of which remains to be tested. In its most elementary stage the hypothesis may be any guess, hunch, imaginative idea, which becomes the basis for action or investigation”.

(G.A.Lundberg)

“It is a proposition which can be put to test to determine validity”. (Goode and Hatt).

“A hypothesis is a question put in such a way that an answer of some kind can be forth coming” - (Rummel and Ballaine).

These definitions lead us to conclude that a hypothesis is a tentative solution or explanation or a guess or assumption or a proposition or a statement to the problem facing the researcher, adopted on a cursory observation of known and available data, as a basis of investigation, whose validity is to be tested or verified.

2.4.2 Types of Hypothesis

Hypotheses can be classified in a variety of ways into different types or kinds. The following are some of the types of hypotheses:

- i) **Explanatory Hypothesis:** The purpose of this hypothesis is to explain a certain fact. All hypotheses are in a way explanatory for a hypothesis is advanced only when we try to explain the observed fact. A large number of hypotheses are advanced to explain the individual facts in life. A theft, a murder, an accident are examples.
- ii) **Descriptive Hypothesis:** Some times a researcher comes across a complex phenomenon. He/ she does not understand the relations among the observed facts. But how to account for these facts? The answer is a descriptive hypothesis. A hypothesis is descriptive when it is based upon the points of resemblance of some thing. It describes the **cause** and **effect** relationship of a phenomenon e.g., the current unemployment rate of a state exceeds 25% of the work force. Similarly, the consumers of local made products constitute a significant market segment.
- iii) **Analogical Hypothesis:** When we formulate a hypothesis on the basis of similarities (analogy), it is called an analogical hypothesis e.g., families with higher earnings invest more surplus income on long term investments.
- iv) **Working hypothesis:** Some times certain facts cannot be explained adequately by existing hypotheses, and no new hypothesis comes up. Thus, the investigation is held up. In this situation, a researcher formulates a hypothesis which enables to continue investigation. Such a hypothesis, though inadequate and formulated for the purpose of further investigation only, is called a working hypothesis. It is simply accepted as a starting point in the process of investigation.
- v) **Null Hypothesis:** It is an important concept that is used widely in the sampling theory. It forms the basis of many tests of significance. Under this type, the hypothesis is stated negatively. It is null because it may be nullified, if the evidence of a random sample is unfavourable to the hypothesis. It is a hypothesis being tested (H_0). If the calculated value of the test is less than the permissible value, Null hypothesis is accepted, otherwise it is rejected. The rejection of a null hypothesis implies that the difference could not have arisen due to chance or sampling fluctuations.

- vi) **Statistical Hypothesis:** Statistical hypotheses are the statements derived from a sample. These are quantitative in nature and are numerically measurable. For example, the market share of product X is 70%, the average life of a tube light is 2000 hours etc.

2.4.3 Criteria for Workable Hypothesis

A hypothesis controls and directs the research study. When a problem is felt, we require the hypothesis to explain it. Generally, there is more than one hypothesis which aims at explaining the same fact. But all of them cannot be equally good. Therefore, how can we judge a hypothesis to be true or false, good or bad? Agreement with facts is the sole and sufficient test of a true hypothesis. Therefore, certain conditions can be laid down for distinguishing a good hypothesis from bad ones. The formal conditions laid down by thinkers provide the criteria for judging a hypothesis as good or valid. These conditions are as follows:

- i) **A hypothesis should be empirically verifiable:** The most important condition for a valid hypothesis is that it should be empirically verifiable. A hypothesis is said to be verifiable, if it can be shown to be either true or false by comparing with the facts of experience directly or indirectly. A hypothesis is true if it conforms to facts and it is false if it does not. Empirical verification is the characteristic of the scientific method.
- ii) **A hypothesis should be relevant:** The purpose of formulating a hypothesis is always to explain some facts. It must provide an answer to the problem which initiated the enquiry. A hypothesis is called relevant if it can explain the facts of enquiry.
- iii) **A hypothesis must have predictive and explanatory power:** Explanatory power means that a good hypothesis, over and above the facts it proposes to explain, must also explain some other facts which are beyond its original scope. We must be able to deduce a wide range of observable facts which can be deduced from a hypothesis. The wider the range, the greater is its explanatory power.
- iv) **A hypothesis must furnish a base for deductive inference on consequences:** In the process of investigation, we always pass from the known to the unknown. It is impossible to infer any thing from the absolutely unknown. We can only infer what would happen under supposed conditions by applying the knowledge of nature we possess. Hence, our hypothesis must be in accordance with our previous knowledge.
- v) **A hypothesis does not go against the traditionally established knowledge:** As far as possible, a new hypothesis should not go against any previously established law or knowledge. The new hypothesis is expected to be consistent with the established knowledge.
- vi) **A hypothesis should be simple:** A simple hypothesis is preferable to a complex one. It some times happens that there are two or more hypotheses which explain a given fact equally well. Both of them are verified by observable facts. Both of them have a predictive power and both are consistent with established knowledge. All the important conditions of hypothesis are thus satisfied by them. In such cases the simpler one is to be accepted in preference to the complex one.
- vii) **A hypothesis must be clear, definite and certain:** It is desirable that the hypothesis must be simple and specific to the point. It must be clearly defined in a manner commonly accepted. It should not be vague or ambiguous.

- (viii) **A Hypothesis should be related to available techniques:** If tools and techniques are not available we cannot test the hypothesis. Therefore, the hypothesis should be formulated only after due thought is given to the methods and techniques that can be used to measure the concepts and variables related to the hypothesis.

2.4.4 Stages in Hypothesis

There are four stages. The first stage is feeling of a problem. The observation and analysis of the researcher reveals certain facts. These facts pose a problem. The second stage is formulation of a hypothesis or hypotheses. A tentative supposition/ guess is made to explain the facts which call for an explanation. At this stage some past experience is necessary to pick up the significant aspects of the observed facts. Without previous knowledge, the investigation becomes difficult, if not impossible. The third stage is deductive development of hypothesis using deductive reasoning. The researcher uses the hypothesis as a premise and draws a conclusion from it. And the last stage is the verification or testing of hypothesis. This consists in finding whether the conclusion drawn at the third stage is really true. Verification consists in finding whether the hypothesis agrees with the facts. If the hypothesis stands the test of verification, it is accepted as an explanation of the problem. But if the hypothesis does not stand the test of verification, the researcher has to search for further solutions.

To explain the above stages let us consider a simple example. Suppose, you have started from your home for college on your scooter. A little while later the engine of your scooter suddenly stops. What can be the reason? Why has it stopped? From your past experience, you start guessing that such problems generally arise due to either petrol or spark plug. Then start deducing that the cause could be: (i) that the petrol knob is not on. (ii) that there is no petrol in the tank. (iii) that the spark plug has to be cleaned. Then start verifying them one after another to solve the problem. First see whether the petrol knob is on. If it is not, switch it on and start the scooter. If it is already on, then see whether there is petrol or not by opening the lid of the petrol tank. If the tank is empty, go to the near by petrol bunk to fill the tank with petrol. If there is petrol in the tank, this is not the reason, then you verify the spark plug. You clean the plug and fit it. The scooter starts. That means the problem is with the spark plug. You have identified it. So you got the answer. That means your problem is solved.

2.4.5 Testing of Hypothesis

When the hypothesis has been framed in the research study, it must be verified as true or false. Verifiability is one of the important conditions of a good hypothesis. Verification of hypothesis means testing of the truth of the hypothesis in the light of facts. If the hypothesis agrees with the facts, it is said to be true and may be accepted as the explanation of the facts. But if it does not agree it is said to be false. Such a false hypothesis is either totally rejected or modified. Verification is of two types viz., **Direct verification** and **Indirect verification**.

Direct verification may be either by observation or by experiments. When direct observation shows that the supposed cause exists where it was thought to exist, we have a direct verification. When a hypothesis is verified by an experiment in a laboratory it is called direct verification by experiment. When the hypothesis is not amenable for direct verification, we have to depend on

indirect verification. **Indirect verification** is a process in which certain possible consequences are deduced from the hypothesis and they are then verified directly. Two steps are involved in indirect verification. (i) Deductive development of hypothesis: By deductive development certain consequences are predicted and (ii) finding whether the predicted consequences follow. If the predicted consequences come true, the hypothesis is said to be indirectly verified. Verification may be done directly or indirectly or through logical methods.

Testing of a hypothesis is done by using statistical methods. Testing is used to accept or reject an assumption or hypothesis about a random variable using a sample from the distribution. The assumption is the null hypothesis (H_0), and it is tested against some alternative hypothesis (H_1). Statistical tests of hypothesis are applied to sample data. The procedure involved in testing a hypothesis is A) select a sample and collect the data. B) convert the variables or attributes into statistical form such as mean, proportion. C) formulate hypotheses. D) select an appropriate test for the data such as t-test, Z-test. E) perform computations. F) finally draw the inference of accepting or rejecting the null hypothesis. You will learn more about it in tests of hypothesis or tests of significance in later units (Units-15, 16 and 17).

2.4.6 Uses of Hypothesis

If a clear scientific hypothesis has been formulated, half of the research work is already done. The advantages/utility of having a hypothesis are summarized here underneath:

- i) It is a starting point for many a research work.
- ii) It helps in deciding the direction in which to proceed.
- iii) It helps in selecting and collecting pertinent facts.
- iv) It is an aid to explanation.
- v) It helps in drawing specific conclusions.
- vi) It helps in testing theories.
- vii) It works as a basis for future knowledge.

Self Assessment Exercise C

- 1) What do you mean by a hypothesis?

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- 2) List out different types of hypothesis.

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- 3) What is meant by null hypothesis?

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4) What are the characteristics of good hypothesis testing?

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5) What are the stages in a hypothesis?

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6) What are the methods used to prove or reject a hypothesis ?

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2.5 RESEARCH DESIGN

Research design is also known by different names such as research outline, plan, blue print. In the words of Fred N. Kerlinger, it is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and control variance. The plan includes everything the investigator will do from writing the hypothesis and their operational implications to the final analysis of data. The structure is the outline, the scheme, the paradigms of the operation of the variables. The strategy includes the methods to be used to collect and analyze the data. At the beginning this plan (design) is generally vague and tentative. It undergoes many modifications and changes as the study progresses and insights into it deepen. The working out of the plan consists of making a series of decisions with respect to what, why, where, when, who and how of the research.

According to Pauline V.Young “a research design is the logical and systematic planning and directing of a piece of research”. According to Reger E.Kirk “research designs are plans that specify how data should be collected and analyzed”.

The research has to be geared to the available time, energy, money and to the availability of data. There is no such thing as a single or correct design. Research design represents a compromise dictated by many practical considerations that go into research.

2.5.1 Functions of Research Design

Regardless of the type of research design selected by the investigator, all plans perform one or more functions outlined below.

- i) It provides the researcher with a blue print for studying research questions.
- ii) It dictates boundaries of research activity and enables the investigator to channel his energies in a specific direction.
- iii) It enables the investigator to anticipate potential problems in the implementation of the study.
- iv) The common function of designs is to assist the investigator in providing answers to various kinds of research questions.

A study design includes a number of component parts which are interdependent and which demand a series of decisions regarding the definitions, methods, techniques, procedures, time, cost and administration aspects.

2.5.2 Components of a Research Design

A research design basically is a plan of action. Once the research problem is selected, then it must be executed to get the results. Then how to go about it? What is its scope? What are the sources of data? What is the method of enquiry? What is the time frame? How to record the data? How to analyze the data? What are the tools and techniques of analysis? What is the manpower and organization required? What are the resources required? These and many such are the subject matter of attacking the research problem demanding decisions in the beginning itself to have greater clarity about the research study. It is similar to having a building plan before the building is constructed. Thus, according to P.V. Young the various “considerations which enter into making decisions regarding what, where, when, how much, by what means constitute a plan of study or a study design”. Usually the contents or components of a Research design are as follows:

- 1) **Need for the Study:** Explain the need for and importance of this study and its relevance.
- 2) **Review of Previous Studies:** Review the previous works done on this topic, understand what they did, identify gaps and make a case for this study and justify it.
- 3) **Statement of Problem:** State the research problem in clear terms and give a title to the study.
- 4) **Objectives of Study:** What is the purpose of this study? What are the objectives you want to achieve by this study? The statement of objectives should not be vague. They must be specific and focussed.
- 5) **Formulation of Hypothesis:** Conceive possible outcome or answers to the research questions and formulate into hypothesis tests so that they can be tested.
- 6) **Operational Definitions:** If the study is using uncommon concepts or unfamiliar tools or using even the familiar tools and concepts in a specific sense, they must be specified and defined.
- 7) **Scope of the Study:** It is important to define the scope of the study, because the scope decides what is within its purview and what is outside.

Scope includes

- Geographical area to be covered.
- Subject content to be covered.
- Time period to be covered.

Scope includes Geographical scope, content scope, chronological scope of the study. The territorial area to be covered by the study should be decided. E.g. only Delhi or northern states or All India. As far as content scope is concerned according to the problem say for example, industrial relations in so and so organization, what are aspects to be studied, what are the aspects not coming under this and hence not studied. Chronological scope i.e., time period selection and its justification is important. Whether the study is at a point of time or longitudinal say 1991-2003.

- 8) **Sources of Data:** This is an important stage in the research design. At this stage, keeping in view the nature of research, the researcher has to decide the sources of data from which the data are to be collected. Basically the sources

are divided into primary source (field sources) and secondary source (documentary sources). The data from primary source are called as primary data, and data from secondary source are called secondary data. Hence, the researcher has to decide whether to collect from primary source or secondary source or both sources. (This will be discussed in detail in Unit-3).

- 9) **Method of Collection:** After deciding the sources for data collection, the researcher has to determine the methods to be employed for data collection, primarily, either census method or sampling method. This decision may depend on the nature, purpose, scope of the research and also time factor and financial resources.
- 10) **Tools & Techniques:** The tools and techniques to be used for collecting data such as observation, interview, survey, schedule, questionnaire, etc., have to be decided and prepared.
- 11) **Sampling Design:** If it is a sample study, the sampling techniques, the size of sample, the way samples are to be drawn etc., are to be decided.
- 12) **Data Analysis:** How are you going to process and analyze the data and information collected? What simple or advanced statistical techniques are going to be used for analysis and testing of hypothesis, so that necessary care can be taken at the collection stage.
- 13) **Presentation of the Results of Study:** How are you going to present the results of the study? How many chapters? What is the chapter scheme? The chapters, their purpose, their titles have to be outlined. It is known as chapterisation.
- 14) **Time Estimates:** What is the time available for this study? Is it limited or unlimited time? Generally, it is a time bound study. The available or permitted time must be apportioned between different activities and the activities to be carried out within the specified time. For example, preparation of research design one month, preparation of questionnaire one month, data collection two months, analysis of data two months, drafting of the report two months etc.,
- 15) **Financial Budget:** The design should also take into consideration the various costs involved and the sources available to meet them. The expenditures like salaries (if any), printing and stationery, postage and telephone, computer and secretarial assistance etc.
- 16) **Administration of the Enquiry:** How is the whole thing to be executed? Who does what and when? All these activities have to be organized systematically, research personnel have to be identified and trained. They must be entrusted with the tasks, the various activities are to be coordinated and the whole project must be completed as per schedule.

Research designs provide guidelines for investigative activity and not necessarily hard and fast rules that must remain unbroken. As the study progresses, new aspects, new conditions and new connecting links come to light and it is necessary to change the plan / design as circumstances demand. A universal characteristic of any research plan is its flexibility.

Depending upon the method of research, the designs are also known as survey design, case study design, observation design and experimental design.

2.6 PILOT STUDY AND PRE-TESTING

A **Pilot study** is a small scale replica of the main study. When a problem is selected for research, a plan of action is to be designed to proceed further. But if we do not have adequate knowledge about the subject matter, the nature of the population (The word ‘population’ as used in statistics denotes the aggregate from which the sample is to be taken), the various issues involved, the tools and techniques to be used for operationalizing the research problem, we have to familiarize ourselves first with it and acquire a good deal of knowledge about the subject matter of the study and its dimensions. For this purpose, a small study is conducted before the main study, which is called a Pilot Study. A pilot study provides a better knowledge of the problem and its dimensions. It facilitates us to understand the nature of the population to be surveyed and the field problems to be encountered. It also helps in developing better approaches and better instruments. It covers the entire process of research, but on a small scale. This is also useful for preparing the research design clearly and specifically.

Pre-Testing is the hallmark of scientific research. Pre-testing means trial administration of the instrument to sample respondents before finalizing it. It is a common practice in our day-to-day life that before finally okaying it we try it on a trial basis. For example, when some recipe is prepared a sample is tasted, based on that corrections are made. If you give a suit for stitching to the tailor, you want a trial wear (or pre-test), if you are purchasing a vehicle, you want to have a trial drive. Similarly, for data collection some instruments such as interview schedule, or questionnaire or measurement scale are constructed. We want to administer it on a trial basis to identify its weaknesses, if any. Such a trial administration of the instrument is called pre-testing.

While designing the instrument or method, we take all precautions keeping in view the requirements of the study. We will not be able to identify its defects, limitations and weaknesses easily. But when others use it, they will be able to identify them objectively. Therefore, it has to be tested empirically, hence pre-testing of a draft instrument is a must. Based on the opinions, comments, criticism, suggestions received and difficulties experienced in the pre-testing the instrument or method is revised or modified and then finalized for using it in the main study.

The difference between pilot study and pre-test is that, the former is a full fledged miniature study of a research problem, where as the latter is a trial test of a specific aspect of the study, such as a questionnaire.

Self Assessment Exercise D

- 1) What are the different names of research design?

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- 2) What is meant by research plan?

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3) What are the functions of a research design?

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4) What do you mean by scope of study?

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5) Distinguish between pilot study and pre-test.

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2.7 LET US SUM UP

Without a problem, research cannot proceed. A problem is some difficulty experienced by the researcher in a theoretical or practical situation. Solving this difficulty is the task of research. The problem for research should ordinarily be expressed in an interrogative form. If the researcher has a ready problem on hand he can proceed further. Otherwise, he has to search for a problem. The problem can be from business in general or functional areas in particular. Other sources of research problems are: day to day problems, technological changes, unexplored areas, books, theses, articles, policy problems etc., Having selected the problem it must be defined and specified.

Having specified the problem, the next step is to formulate the objectives of research so as to give direction to the study. The researcher should also propose a set of suggested solutions to the problem under study. Such tentative solutions formulated are called hypotheses. The hypotheses are of various types such as explanatory hypothesis, descriptive hypothesis, analogical hypothesis, working hypothesis, null hypothesis and statistical hypothesis. A good hypothesis must be empirically verifiable, should be relevant, must have explanatory power, must be as far as possible within the established knowledge, must be simple, clear and definite. There are four stages in a hypothesis (a) feeling a problem (b) formulating hypothesis (c) deductive development of hypothesis and (d) verification / testing of hypothesis verification can be done either directly or indirectly or through logical methods. Testing is done by using statistical methods.

Having selected the problem, formulated the objectives and hypothesis, the researcher has to prepare a blue print or plan of action, usually called as research design. The design/study plan includes a number of components which are interdependent and which demand a series of decisions regarding definitions, scope, methods, techniques, procedures, instruments, time, place, expenditure and administration aspects.

If the problem selected for research is not a familiar one, a pilot study may be conducted to acquire knowledge about the subject matter, and the various issues involved. Then for collection of data instruments and/or scales have to be constructed, which have to be pre-tested before finally accepting them for use.

- 5) What is meant by hypothesis? Explain the criteria for a workable hypothesis.
- 6) What are the different stages in a hypothesis? How do you verify / test a hypothesis?
- 7) What is a research design? Explain the functions of a research design.
- 8) Define a research design and explain its contents.
- 9) What are the various components of a research design?
- 10) Distinguish between pilot study and pre-test. Also explain the need for Pilot study and pre-testing.

Note: These questions/exercises will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the university for assessment. These are for your practice only.

2.11 FURTHER READING

The following text books may be used for more indepth study on the topics dealt with in this unit.

Fred N. Kerlinger. *Foundations of Behavioural Research*, Surjeet Publications, Delhi.

O.R.Krishna Swamy. *Methodology of Research in Social Sciences*, Himalaya Publishing House, Mumbai.

T.S.Wilkinson & P.L.Bhandarkar. *Methodology and Techniques of Social Research*, Himalaya Publishing House, Mumbai.

C.R.Kothari. *Research Methodology*, Wiley Eastern, New Delhi.

V.P.Michael. *Research Methodology in Management*, Himalaya Publishing House, Mumbai.