# Module 2

**Defining a research problem** properly and clearly is a crucial part of a research study and must in no case be accomplished hurriedly. However, in practice this a frequently overlooked which causes a lot of problems later on. Hence, the research problem should be defined in a systematic manner, giving due weightage to all relating points. The technique for the purpose involves the undertaking of the following steps generally one after the other:

(i) statement of the problem in a general way;

(ii) understanding the nature of the problem;

(iii) surveying the available literature

(iv) developing the ideas through discussions; and

(v) rephrasing the research problem into a working proposition.

A brief description of all these points will be helpful.

**(i) Statement of the problem in a general way:** First of all, the problem should be stated in a broad general way, keeping in view either some practical concern or some scientific or intellectual interest. For this purpose, the researcher must immerse himself thoroughly in the subject matter concerning which he wishes to pose a problem. In case of social research, it is considered advisable to do some field observation and as such the researcher may undertake some sort of preliminary survey or what is often called *pilot survey*. Then the researcher can himself state the problem or he can seek the guidance of the guide or the subject expert in accomplishing this task. Often, the guide puts forth the problem in general terms, and it is then up to the researcher to narrow it down and phrase the problem in operational terms. In case there is some directive from an organisational authority, the problem then can be stated accordingly. The problem stated in a broad general way may contain various ambiguities which must be resolved by cool thinking and rethinking over the problem. At the same time the feasibility of a particular solution has to be considered and the same should be kept in view while stating the problem.

**(ii) Understanding the nature of the problem:** The next step in defining the problem is to understand its origin and nature clearly. The best way of understanding the problem is to discuss it with those who first raised it in order to find out how the problem originally came about and with what objectives in view. If the researcher has stated the problem himself, he should consider once again all those points that induced him to make a general statement concerning the problem. For a better understanding of the nature of the problem involved, he can enter into discussion with those who have a good knowledge of the problem concerned or similar other problems. The researcher should also keep in view the environment within which the problem is to be studied and understood.

**Surveying the available literature:** All available literature concerning the problem at hand must necessarily be surveyed and examined before a definition of the research problem is

given. This means that the researcher must be well-conversant with relevant theories in the field, reports and records as also all other relevant literature. He must devote sufficient time in reviewing of research already undertaken on related problems. This is done to find out what data and other materials, if any, are available for operational purposes. "Knowing what data are available often serves to narrow the problem itself as well as the technique that might be used." This would also help a researcher to know if there are certain gaps in the theories, or whether the existing theories applicable to the problem under study are inconsistent with each other, or whether the findings of the different studies do not follow a pattern consistent with the theoretical expectations and so on. All this will enable a researcher to take new strides in the field for furtherance of knowledge i.e., he can move up starting from the existing premise. Studies on related problems are useful for indicating the type of difficulties that may be encountered in the present study as also the possible analytical shortcomings. At times such studies may also suggest useful and even new lines of approach to the present problem.

**(iv) Developing the ideas through discussions:** Discussion concerning a problem often produces useful information. Various new ideas can be developed through such an exercise. Hence, a researcher must discuss his problem with his colleagues and others who have enough experience in the same area or in working on similar problems. This is quite often known as an *experience survey*. People with rich experience are in a position to enlighten the researcher on different aspects of his proposed study and their advice and comments are usually invaluable to the researcher. They help him sharpen his focus of attention on specific aspects within the field. Discussions with such persons should not only be confined to the formulation of the specific problem at hand, but should also be concerned with the general approach to the given problem, techniques that might be used, possible solutions, etc.

**(v) Rephrasing the research problem:** Finally, the researcher must sit to rephrase the research problem into a working proposition. Once the nature of the problem has been clearly understood, the environment (within which the problem has got to be studied) has been defined, discussions over the problem have taken place and the available literature has been surveyed and examined, rephrasing the problem into analytical or operational terms is not a difficult task. Through rephrasing, the researcher puts the research problem in as specific terms as possible so that it may become operationally viable and may help in the development of working hypotheses.

AN ILLUSTRATION

The technique of defining a problem outlined above can be illustrated for better understanding by

taking an example as under:

Let us suppose that a research problem in a broad general way is as follows:

"Why is productivity in Japan so much higher than in India"?

In this form the question has a number of ambiguities such as: What sort of productivity is being referred to? With what industries the same is related? With what period of time the productivity is being talked about? In view of all such ambiguities the given statement or the question is much too general to be amenable to analysis. Rethinking and discussions about the problem may result in narrowing down the question to:

“What factors were responsible for the higher labour productivity of Japan’s manufacturing

industries during the decade 1971 to 1980 relative to India’s manufacturing industries?”

This latter version of the problem is definitely an improvement over its earlier version for the various ambiguities have been removed to the extent possible. Further rethinking and rephrasing might place the problem on a still better operational basis as shown below:

“To what extent did labour productivity in 1971 to 1980 in Japan exceed that of India in respect of 15 selected manufacturing industries? What factors were responsible for the productivity differentials between the two countries by industries?”

## Exploratory study

An exploratory study is undertaken when not much is known about the situation at hand, or no information is available on how similar problems or research issues have been solved in the past, In such cases, extensive preliminary work need to be done to gain familiarity with the phenomena in the situation, ad understand what is occurring, before we develop a model and setup rigorous design for comprehensive investigation.

## Descriptive- refer module 1

## Hypothesis Testing Approach

WHAT IS A HYPOTHESIS?

Ordinarily, when one talks about hypothesis, one simply means a mere assumption or some supposition to be proved or disproved. But for a researcher hypothesis is a formal question that he intends to resolve.

Hypothesis is usually considered as the principal instrument in research. Its main function is to suggest new experiments and observations. In fact, many experiments are carried out with the deliberate object of testing hypotheses. Decision-makers often face situations wherein they are interested in testing hypotheses on the basis of available information and then take decisions on the basis of such testing. In social science, where direct knowledge of population parameter(s) is rare, hypothesis testing is the often used strategy for deciding whether a

sample data offer such support for a hypothesis that generalisation can be made. Thus, hypothesis testing enables us to make probability statements about population parameter(s).

## Case Study

A case study research design usually involves qualitative methods, but quantitative methods are sometimes also used. Case studies are good for describing, comparing, evaluating and understanding different aspects of a research problem.

A case study is an appropriate research design when you want to gain concrete, contextual, in-depth knowledge about a specific real-world subject. It allows you to explore the key characteristics, meanings, and implications of the case.

Case studies are often a good choice in a thesis or dissertation. They keep your project focused and manageable when you don't have the time or resources to do large-scale research.

## Literature Survey

**Extensive literature survey:** Once the problem is formulated, a brief summary of it should be written down. It is compulsory for a research worker writing a thesis for a Ph.D. degree to write a synopsis of the topic and submit it to the necessary Committee or the Research Board for approval.

At this juncture the researcher should undertake extensive literature survey connected with the problem. For this purpose, the abstracting and indexing journals and published or unpublished bibliographies are the first place to go to. Academic journals, conference proceedings, government reports, books etc., must be tapped depending on the nature of the problem. In this process, it should be remembered that one source will lead to another. The earlier studies, if any, which are similar to the study in hand should be carefully studied. A good library will be a great help to the researcher at this stage.

### Types of variables

Researchers organize variables into a variety of categories, the most common of which include:

### Independent variables

An independent variable is a singular characteristic that the other variables in your experiment cannot change. Age is an example of an independent variable. Where someone lives, what they eat or how much they exercise are not going to change their age. Independent variables can, however, change other variables. In studies, researchers often try to find out whether an independent variable causes other variables to change and in what way.

## Dependent variables

A dependent variable relies on and can be changed by other components. A grade on an exam is an example of a dependent variable because it depends on factors such as how much sleep you got and how long you studied. Independent variables can influence dependent variables, but dependent variables cannot influence independent variables. For example, the time you spent studying (dependent) can affect the grade on your test (independent) but the grade on your test does not affect the time you spent studying.

## Control variables

Control or controlling variables are characteristics that are constant and do not change during a study. They have no effect on other variables. Researchers might intentionally keep a control variable the same throughout an experiment to prevent bias. For example, in an experiment about plant development, control variables might include the amounts of fertilizer and water each plant gets. These amounts are always the same so that they do not affect the plants' growth.

## Extraneous variables

Extraneous variables are factors that affect the dependent variable but that the researcher did not originally consider when designing the experiment. These unwanted variables can unintentionally change a study's results or how a researcher interprets those results. Take, for example, a study assessing whether private tutoring or online courses are more effective at improving students' Spanish test scores. Extraneous variables that might unintentionally influence the outcome include parental support, prior knowledge of a foreign language or socioeconomic status.

Hypothesis must possess the following characteristics:

(i) Hypothesis should be clear and precise. If the hypothesis is not clear and precise, the inferences drawn on its basis cannot be taken as reliable.

(ii) Hypothesis should be capable of being tested. In a swamp of untestable hypotheses, many a time the research programmes have bogged down. Some prior study may be done by researcher in order to make hypothesis a testable one. A

hypothesis “is testable if other deductions can be made from it which, in turn, can be confirmed or disproved by observation.”

(iii) Hypothesis should state relationship between variables, if it happens to be a relational hypothesis.

(iv) Hypothesis should be limited in scope and must be specific. A researcher must remember that narrower hypotheses are generally more testable and he should develop such hypotheses.

(v) Hypothesis should be stated as far as possible in most simple terms so that the same is easily understandable by all concerned. But one must remember that simplicity of hypothesis has nothing to do with its significance.

**Development of working hypotheses:** After extensive literature survey, researcher should state in clear terms the working hypothesis or hypotheses. Working hypothesis is tentative assumption made in order to draw out and test its logical or empirical consequences. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research.

They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required 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 piece of research in hand because it has to be tested. The role of the hypothesis is to guide the researcher by delimiting the area of research and to keep him on the right track. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data required and the type of methods of data analysis to be used.

How does one go about developing working hypotheses? The answer is by using the following approach:

(a) Discussions with colleagues and experts about the problem, its origin and the objectives in seeking a solution;

(b) Examination of data and records, if available, concerning the problem for possible trends, peculiarities and other clues;

(c) Review of similar studies in the area or of the studies on similar problems; and

(d) Exploratory personal investigation which involves original field interviews on a limited scale

with interested parties and individuals with a view to secure greater insight into the practical aspects of the problem.

**Preparing the research design:** The research problem having been formulated in clear cut terms, the researcher will be required to prepare a research design, i.e., he will have to state the conceptual structure within which research would be conducted. The preparation of such a design facilitates research to be as efficient as possible yielding maximal information. In other words, the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money.

But how all these can be achieved depends mainly on the research purpose. Research purposes may be grouped into four categories, viz.,

(i) Exploration, (ii) Description, (iii) Diagnosis, and (iv) Experimentation.

A flexible research design which provides opportunity for considering many different aspects of a problem is considered appropriate if the purpose of the research study is that of exploration. But when the purpose happens to be an accurate description of a situation or of an association between variables, the suitable design will be one that minimises bias and maximises the reliability of the data collected and analysed.

There are several research designs, such as, experimental and non-experimental hypothesis testing. Experimental designs can be either informal designs (such as before-and-after without control, after-only with control, before-and-after with control) or formal designs (such as completely randomized design, randomized block design, Latin square design, simple and complex factorial designs), out of which the researcher must select one for his own project.

The preparation of the research design, appropriate for a particular research problem, involves usually the consideration of the following:

(i) the means of obtaining the information;

(ii) the availability and skills of the researcher and his staff (if any);

(iii) explanation of the way in which selected means of obtaining information will be organised and the reasoning leading to the selection;

(iv) the time available for research; and

(v) the cost factor relating to research, i.e., the finance available for the purpose.

**Validity** refers to the extent to which a test measures what we actually wish to measure.

Two forms of validity are usually mentioned in research literature viz., the external validity and the internal validity.

External validity of research findings is their generalizability to populations, settings, treatment variables and measurement variables. The internal validity of a research design is its ability to measure what it aims to measure.

## Module 3

## Sources of Data -PRIMARY AND SECONDARY DATA

The Primary data are original data which are collected for the first time for a specific purpose. Such data are published by authorities who themselves are responsible for their collection.

The Secondary data on the other hand, are those which have already been collected by some other agency and which have already been processed. Secondary data may be available in the form of published or unpublished sources. For instance, population census data collected by the Government in a country is primary data for that Government. But the same data becomes secondary for those researchers who use it later. In case you have decided to collect primary data for your investigation, you have to identify the sources from where you can collect that data. For example, if you wish to study the problems of the workers of X Company Ltd., then the workers who are working in that company are the source. On the other hand, if you have decided to use secondary data, you have to identify the secondary source who have already collected the related data for their study purpose.

SOURCES OF SECONDARY DATA We have discussed above the meaning of primary and secondary data. Sometimes, it is not possible to collect primary data due to time, cost and human resource constraints.

Therefore, researchers have to take the help of secondary data.

Now let us discuss, (a) various sources from where, one can get secondary data,

(b) precautions while using secondary data, its merits and demerits and some documentary and electronic sources of data in India.

Documentary Sources of Data –

This category of secondary data source may also be termed as Paper Source. The main sources of documentary data can be broadly classified into two categories:

a) Published sources, and

b) Unpublished sources.

Published Sources- There are various national and international institutions, semi-official reports of various committees and commissions and private publications which

collect and publish statistical data relating to industry, trade, commerce, health etc. These publications of various organisations are useful sources of secondary data.

These are as follows:

1) Government Publications: Central and State Governments publish current information alongwith statistical data on various subjects, quarterly and annually. For example, Monthly Statistical Abstract, National Income Statistics, Economic Survey, Reports of National Council of Applied Economic Research (NCEAR), Federation of Indian Chambers of Commerce and Industry (FICCI), Indian Council of Agricultural Research (ICAR), Central Statistical Organisation (CSO), etc.

2) International Publications: The United Nations Organisation (UNO), International Labour Organisation (ILO), International Monetary Fund (IMF), World Bank, Asian Development Bank (ADB) etc., also publish relevant data and reports.

3) Semi-official Publications: Semi-official organisations like Corporations, District Boards, Panchayat etc. publish reports.

4) Committees and Commissions: Several committees and commissions appointed by State and Central Governments provide useful secondary data. For example, the report of the 10th Financial Commission or Fifth Pay Commissions etc.

5) Private Publications: Newspapers and journals publish the data on different fields of Economics, Commerce and Trade. For example, Economic Times, Financial Express etc. and Journals like Economist, Economic and Political Weekly, Indian Journal of Commerce, Journal of Industry and Trade, Business Today etc. Some of the research and financial institutions also publish their reports annually like Indian Institute of Finance. In addition to this, reports prepared by research scholars, universities etc. also provide secondary source of information.

Unpublished Sources It is not necessary that all the information/data maintained by the institutions or individuals are available in published form. Certain research institutions, trade associations, universities, research scholars, private firms, business institutions etc., do collect data but they normally do not publish it. We can get this information from their registers, files etc.

## DATA COLLECTION METHODS-

**Observation Method** -The Concise Oxford Dictionary defines observation as, 'accurate watching and noting of phenomena as they occur in nature with regard to cause and effect or mutual relations'.

Thus observation is not only a systematic watching but it also involves listening and reading, coupled with consideration of the seen phenomena. It involves three processes.

They are: sensation, attention or concentration and perception.

Under this method, the researcher collects information directly through observation rather than through the reports of others.

It is a process of recording relevant information without asking anyone specific questions and in some cases, even without the knowledge of the respondents.

This method of collection is highly effective in behavioural surveys. For instance, a study on behaviour of visitors in trade fairs, observing the attitude of workers on the job, bargaining strategies of customers etc.

Observation can be participant observation or non-participant observation. In Participant Observation Method, the researcher joins in the daily life of informants or organisations, and observes how they behave. In the Non-participant Observation Method, the researcher will not join the informants or organisations but will watch from outside.

Merits-

1) This is the most suitable method when the informants are unable or reluctant to provide information.

2) This method provides deeper insights into the problem and generally the data is accurate and quicker to process. Therefore, this is useful for intensive study rather than extensive study.

Limitations-

Despite of the above merits, this method suffers from the following limitations:

1) In many situations, the researcher cannot predict when the events will occur. So, when an event occurs there may not be a ready observer to observe the event.

2) Participants may be aware of the observer and as a result may alter their behaviour.

3) Observer, because of personal biases and lack of training, may not record specifically what he/she observes. 4) This method cannot be used extensively if the inquiry is large and spread over a wide area.

## Interview Method

Interview is one of the most powerful tools and most widely used method for primary data collection in business research. In our daily routine we see interviews on T.V. channels on various topics related to social, business, sports, budget etc.

Thus an interview is basically, a meeting between two persons to obtain the information related to the proposed study. The person who is interviewing is named as interviewer and the person who is being interviewed is named as informant. It is to be noted that, the research data/information collect through this method is not a simple conversation between the investigator and the informant, but also the glances, gestures, facial expressions, level of speech etc., are all part of the process. Through this method, the researcher can collect varied types of data intensively and extensively.

In the Structured interview set questions are asked and the responses are recorded in a standardised form. This is useful in large scale interviews where a number of investigators are assigned the job of interviewing. The researcher can minimise the bias of the interviewer. This technique is also named as formal interview.

In Un-structured interview, the investigator may not have a set of questions but have only a number of key points around which to build the interview. Normally, such type of interviews are conducted in the case of an explorative survey where the researcher is not completely sure about the type of data he/ she collects. It is also named as informal interview. Generally, this method is used as a supplementary method of data collection in conducting research in business areas.

Merits The major merits of this method are as follows:

1) People are more willing to supply information if approached directly. Therefore, personal interviews tend to yield high response rates.

2) This method enables the interviewer to clarify any doubt that the interviewee might have while asking him/her questions. Therefore, interviews are helpful in getting reliable and valid responses.

Limitations The limitations of this method are as follows:

1) The chance of the subjective factors or the views of the investigator may come in either consciously or unconsciously.

2) The interviewers must be properly trained, otherwise the entire work may be spoiled.

**Questionnaire Method**

Under this method, questionnaires are sent personally or by post to various informants with a request to answer the questions and return the questionnaire.

If the questionnaire is posted to informants, it is called a Mail Questionnaire.

Sometimes questionnaires may also sent through E-mail depending upon the nature of study and availability of time and resources. After receiving the questionnaires the informants read the questions and record their responses in the space meant for the purpose on the questionnaire.

It is desirable to send the quetionnaire with self-addressed envelopes for quick and high rate of response.

Merits

1) You can use this method in cases where informants are spread over a vast geographical area.

2) Respondents can take their own time to answer the questions. So the researcher can obtain original data by this method.

3) This is a cheap method because its mailing cost is less than the cost of personal visits.

4) This method is free from bias of the investigator as the information is given by the respondents themselves.

5) Large samples can be covered and thus the results can be more reliable and dependable.

Limitations

1)Respondents may not return filled in questionnaires, or they can delay in replying to the questionnaires.

2) This method is useful only when the respondents are educated and co-operative.

3) Once the questionnaire has been despatched, the investigator cannot modify the questionnaire.

4) It cannot be ensured whether the respondents are truly representative.

A **“sample”** is a miniature representation of and selected from a larger group or aggregate. In other words, the sample provides a specimen picture of a larger whole. This larger whole is termed as the “population” or “universe”.

It is not possible to include all units of a population in a study in order to arrive at a valid conclusion. Moreover, the sizes of populations are often so large that the study of all the units would not only be expensive but also cumbersome and time consuming. For example, there are more than fifty thousand undergraduate students in IGNOU. For our research, it is impossible to collect information about the study habits of all these students. So, for the survey a researcher will have to select a representative few, i.e., a sample from the population. This process is known as sampling.

NEED FOR SAMPLING

Sampling is used in practice for a variety of reasons such as:

1. Sampling can save time and money. A sample study is usually less expensive than a census study and produces results at a relatively faster speed.

2. Sampling may enable more accurate measurements for a sample study is generally conducted by trained and experienced investigators.

3. Sampling remains the only way when population contains infinitely many members.

4. Sampling remains the only choice when a test involves the destruction of the item under study.

5. Sampling usually enables to estimate the sampling errors and, thus, assists in obtaining information concerning some characteristic of the population.

## Simple or unrestricted random sampling

Simple random sampling is a method of selecting a sample from a finite population in such a way that every unit of the population is given an equal chance of being selected In practice, you can draw a simple random sample unit by unit through the following steps:

1. Define the population
2. Make a list of all the units in the population and number them from 1 to n.
3. Decide the size of the sample, or the number of units to be included in the sample.
4. Use either the ‘lottery method’ or ‘random number tables’ to pick the units to be included in the sample.

Convenience sampling is defined as a method adopted by researchers where they collect market research data from a conveniently available pool of respondents. It is the most commonly used sampling technique as it's incredibly prompt, uncomplicated, and economical. In many cases, members are readily approachable to be a part of the sample.

Researchers use various sampling techniques in situations where there are large populations. In most cases, testing the entire community is practically impossible because they are not easy to reach. Researchers use convenience sampling in situations where additional inputs are not necessary for the principal research. There are no criteria required to be a part of this sample. Thus, it becomes incredibly simplified to include elements in this sample. All components of the population are eligible and dependent on the researcher's proximity to get involved in the sample.

**A good example of convenience sampling is:** A new NGO wants to establish itself in 20 cities. It selects the top 20 cities to serve based on the proximity to where they're based.