CHAPTER - V

RESEARCH DESIGN
METHODOLOGY AND
SOURCES OF DATA
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RESEARCH, DESIGN, METHODOLOGY AND SOURCES OF DATA

Research methodology is way to systematically solve the problems. It may be understood as a Science of studying the various steps that are generally adopted by a researcher in studying his research problems along with the logic behind them.

This chapter comprises of research methodology aspects of the study, which include the research design, sampling method and data collection methods employed for the studying.

1. RESEARCH DESIGN:

A Research design is the basic plan, which guides the collection, measurement and analysis of data. Decision regarding what when, where, how much and by what means concerning a research studying constitute a research design. In other words research design is the conceptual structure with in which the research is conducted.

It is a map or blue print according to which the research is to be conducted.

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. In fact, the research design is the conceptual structure with in which research is conducted. It constitutes the blue print for the collection, measurement and analysis of data.

It is worthwhile to mention here that a research design is nothing more than the framework of study so that the study will be relevant to the problem, and the study will employ economical procedures. In this chapter an attempt is made to describe various aspects of exploratory, descriptive and experimental research design.

There are three basic type of researched design viz.

1.1 EXPLORATORY RESEARCH DESIGN:

Exploratory research design is also termed as formulate as probably for more precise investigation or of developing the working hypothesis from an operational point of view. The major emphasis in exploratory research is on the discovery of ideas and insights. As such this research design appropriate for such design, which must be flexible enough to provide opportunity for considering different aspects of a problem under study. Generally, the following three are talked about (a) the survey of concerning literature (b) the experience survey and (c) the analysis of insight stimulating examples.

*The survey of concerning literature happens to be the most simple and fruitful method of formulating precisely the research problem or developing
hypothesis. Hypothesis stated by earlier workers may be reviewed and their usefulness is evaluated as a basis for further research. It may also be considered whether the already stated hypothesis suggest new hypothesis. In this way the researcher should review and build upon the work already done by others, but in cases where hypothesis have not yet been formulated, his task is to review the available material for deriving the relevant hypothesis from it.

Besides, the researcher may as well make the bibliographical survey of studies, already made in ones area of interest for precisely formulating the problem. He should also make an attempt to apply concepts and theories developed in different research contexts to the area in which he is working himself. Sometimes the works of creative writers also provide a fertile ground for hypothesis formulation and as such may be looked into by the researcher.

Experience survey means the survey of people who have had practical experience with the problem to be studied. The object of such a survey is to obtain insight into the relationship between variables and new ideas relating to the research problem. For such a survey people who are competent and can contribute new ideas may be carefully selected as respondents to ensure a representation of different types of experience. The respondents so selected and may then be interviewed by the investigator. The researcher must prepare an interview schedule of the systematic questioning of informants. But the interview must ensure flexibility in the sense that the respondents should be allowed to raise issues and questions, which the investigator has not previously considered. Generally, the experience has not previously considered. Generally, the experience-collecting interview is likely to be long and may last for few hours. Hence, it is often considered desirable to send a copy of the questions to be discussed to the respondents for doing some advantage thinking over the various issues involved so that, at the time of interview, they may be able to contribute effectively. Thus, an experience survey may enable the research to define the problem more concisely and help in the formulating of the research hypothesis. This survey may as well provide information about the practical possibilities for doing different types of research.

Analysis of insight-stimulating examples is also a fruitful method for suggesting hypothesis for research. It is particularly suitable in areas where there is little experience to serve as a guide. This method consists of the intensive study of selected instances of the phenomenon in which one is interested. For this purpose the existing records if any, may be examined, the unstructured interviewing may take place, or some other approach may be adopted. Attitude of the investigator, the intensity of the study and the ability of the researcher to draw together diverse information into a unified interpretation are the main Reuters which make this method an appropriate procedure for evoking insights.

Thus, in an exploratory or formulate research design, which merely leads to insights or hypothesis, whatever method or research de sign outlined above is adopted. The only thing essential is that it must continue to remain flexible so that many different facets of problem may be considered.
2. **DESCRIPTIVE/DIAGNOSTIC RESEARCH DESIGN:**

Descriptive research designs are those studies, which are concerned with describing the characteristics of a particular individual, or of a group. Whereas diagnostic research determines the frequency with which something occurs or its association with some thing else. The studies concerning whether certain variables are associated are examples of diagnostic research designs. As against this, designs concerned with specific predictions, with narration of facts and characteristics concerning individual, group or situations are all examples of descriptive research designs.

Most of the social research comes under this category. From the point of view of the research design, the descriptive as well as diagnostic studies share common requirement and as such we may group together these two type of research design. In descriptive as well as in diagnostic studies, the researcher must be able to define clearly, what he wants to measure and must find adequate methods for measuring it along with a clear cut definition of population he wants to study. Since the aim is to obtain complete and accurate information in the said studies, the procedure to be used must be carefully planned.

The research design must make enough provision for protection against bias and must maximize reliability, with due concern for the economical completion of the research study. Descriptive research design must be rigid and not flexible and must focus attention on the following:

Formulating the objective of the study (what the study is about and why is it being made?)

Designing the methods of data collection (what techniques of gathering data will be adopted?)

Selecting the sample (how much material will be needed?)

Collecting the data (where can the required data be found and with what time period should the data be related?)

Processing and analyzing the data.

Reporting the findings

In a descriptive /diagnostic design the first step is to specify the objectives with sufficient precision to ensure that the data collected are relevant. While designing data collection procedure, adequate safeguards against bias and unreliability must be ensured.

Whichever method is selected, questions must be well examined and made unambiguous, interviewers must be instructed not to express their own opinion, observers must be trained so that they uniformly record a given item of behavior. It is always desirable to pre-test the data collection instruments before they are finally used.
of the purpose. In other words, we can say those structured instruments are used in such studies. In most of the descriptive/diagnostic design the researcher takes out sample (s) and then wishes to make statements about the population on the basis of the sample analysis. More often than not, sample has to be designed. Here it may only mentioned that the problem of designing samples should be tackled in such a fashion that the examples might yield accurate information with a minimum amount of research effort. Usually one or more forms of probability sampling, or what is often described as random sampling, are used.

Thus, the research design in case of descriptive/diagnostic design is a comparative design throwing light on all points narrated above and must be prepared keeping in view the objective (s) of the study and the resources available. However, it must ensure the minimization of bias and maximization of reliability of the evidence collected.

3. **EXPERIMENTAL RESEARCH:**

Experimental Research are those where the researcher tests the hypothesis of causal relationships between variables. Experimental Research requires procedures that will not only reduce bias and increase reliability, but will permit drawing inferences about causality. Usually experiments meet this requirement. Hence, when we talk of research design is this research, we often mean the design of experiments.

Descriptive research studies was used by me to focus attention on following

*To describe the characteristics of certain employee group e.g.*

Employee with different age, education and income.

To formulate the objective of study (what the study is about and why is it being made).

- To design the method of data collection (what techniques of gathered data will be adopted)
- To selected the sample (how much material will be needed).
- To process and analysis of data.
- To collect the data (where can the required data be found and with what time period should the data be related).
- **Data Sources:** The sources of data may be primary or secondary, which has to be collected by the researcher whether the primary data or secondary will be used.
- According to **PV YOUNG** the source of data can be classified into documentary source and field source, while the first includes books,
manuscripts, diaries, and letters the second includes the data given by individuals.

- According to **WA Bagel** the sources of data may be classified into primary sources and secondary sources, primary sources include the actual information received from the individuals directly concerned with the problems of study. It also includes all types of published and un-published, public or private, documents and other such types of information.
- According to **G.A. Lunberg** the sources of data may be classified as historical sources and field sources. The historical sources include sources representing the past incidents. Historical sources give information about the conditions and incidents, which cannot be known through observation or any other means of information. Thus historical sources include documents, papers and stone on corruptions concerning past as well as the articles discovered through excavations.

**DATA SOURCES:**

There are two types of data sources. Primary data sources and secondary data sources.

**PRIMARY SOURCES**

The sources of primary data are:

1. **DIRECT OBSERVATION**

   The chief primary sources of information concerning any phenomenon are direct observation.

   This method requires that the social researcher should personally and directly observes the conditions and incidents of his field of study. Direct observation is the most reliable method for gathering information concerning the life, status conduct behaviour, language, festivals, customs and traditions etc. in this observation the observer should be absolutely again has been classified into an anticipant observation the observer lives in the groups or community as a member of it and participates in their life. On the contrary (i non-participant observation the researcher does not participant in the group life but only observes as an external spectator).

2. **QUESTIONNAIRE**

   Questionnaire includes questions concerning different aspects of the subject of study. It is used in such cases, where the subject study is very wide and direct observation is not possible. It is also used about such things, which can not be known through direct observation.

   The questionnaires are delivered by hand and other times they are delivered through post. Questionnaires may be sources of information only when the informers are well educated and prepared to cooperate with the research worker.
3. **SCHEDULE**

Schedules are a particular type of questionnaires. The main distinction between questionnaires and schedules is that in the former the informers themselves reply to the questions in schedules. The researcher does himself this himself. He asks the questions to informers and record the replies in the proper places specified in the schedules. The main advantage of a schedule is that it may be used even in the case of uneducated informer. However, it can be used only in a limited field, as compared to the questionnaire method.

**SECONDARY DATA SOURCES**

The sources of secondary data are:

1. **Government Reports**

   The Government undertakes some adhoc and routine investigations in various fields of activity and collects valuable data and information. Some of them are regularly published also.

   These data are available freely and hence used extensively. Reports of various committees also offer plenty of information.

2. **Technical economics and commercial journals**

   In some of the journals, magazines and dailies all types of data and statistical information are published. These data are collected by their own enumerators and hence would be comprehensively accurate and fairly constant.

   Information gathered by professional organizations.

   These bodies collect various information exclusively for their members, chambers of commerce, various trade and tourism associations.

3. **Published or unpublished thesis**

   During the course of any research work various information are collected. these materials offer a lot of statistical information, which are dependable.

4. **Data collected by universities and Research organizations**

   It is permanent source of secondary data. The research scholars gather a lot of information for their specified purpose. These are extremely reliable and could be used as safe secondary data.

   Primary and Secondary both types of data required for the study. In this method the research decides, which sort of data he would used for his study and accordingly he will select one or the other method of data collected information by primary or secondary data give knowledge concerning sociophenomenan.
DATA COLLECTION

Data collection is a key activity of social research. The design of the data collection method is the backbone of research design. These are basically two methods of collecting data: the observation and survey method.

In the observation method, the data is personally collected by the researcher or his agent, whereas in the survey method the data originates from the persons on whom research is conducted.

DATA COLLECTION METHOD

There are two types of data:

1) Secondary and 2) Primary

The Secondary data refers to those data, which were gathered for some other purpose and are already in the firms internal records and commercial, trade or government publications. On the other hand, Primary data do not exist already in records and publications. The researcher has to gather primary data for the specific study.

The primary data is explicitly gathered for a specific research project at hand. The primary data can be collected by questionnaire method.

QUESTIONNAIRE

Data may be collected by issuing written questionnaires and collecting written replies to them. It is believed that while writing the answer a sufficient thought will be given and therefore, it is more reliable than the oral answer provided to an interviewer. The answer can be collected in a standard form to facilitate tabulation and computation. Questionnaire can be prepared to elicit data, specially opinions and feelings on almost any problem. The written questions will more precise and uniform than questions asked orally, in terms of cost and time involved. This method is cheaper than any other method of data collection.

Besides, there are many questions, which an interviewer may feel delicate to ask or reply orally, such problems could be solved by getting written answer in the questionnaire. If the answer are not likely to favor his identity disclosed.

The questionnaire consists of these of questions presented to respondents for their answers. The questionnaire is very flexible in that there are many number of ways to ask questions. Questionnaires need to be carefully developed, tested, and debugged before they are administered on a large scale. One can usually spot several errors in a casually prepared questionnaire.

In preparing the questionnaire, the professional Personnel researcher carefully chooses the questions and their from, wording and sequence.

1. General Form of Questionnaire

So far as the general from of questionnaire is concerned, it can either be structured or unstructured.
Structured questionnaires are those questionnaires in which there are definite, concrete and pre-determined questions are presented with exactly in the same wording and in the same order to all respondents. Structured questionnaire may also have fixed alternative questions in which responses of the informants are limited to the stated alternatives. Thus a highly structured questionnaire is one in which all questioned and answers are specified and comments in the respondent’s own words are held to the minimum. When these characteristics are not present in a questionnaire. More specifically, we can say that in an unstructured questionnaire, the interviewer is provided with a general guide on the type of information to be obtained. But the exact question formulation is largely his own responsibility and the replies are to be taken down in respondent’s words to the extent possible. In some situations tape recorders may be used to achieve this goal.

Structured questionnaires are simple to administer and relatively in expensive to analyze. The provision of alternative replies, at times, helps to understand the meaning of the question clearly. But such questionnaire is have limitations too. For instance, wide range of data and that too in respondent’s own words can not be obtained with structured questionnaires. They are usually considered inappropriate in investigation where the aim happens to be probe for attitudes and reasons for certain actions or feelings. They are equally not suitable when a problem is being first explored and working hypothesis sought. In such situations, instructed questionnaires may be used effectively. Then on the basis of the results obtained in pretest (test in before final use) operations from the use of unstructured questionnaire, one can construct a structured questionnaire for use in the main study.

2. **Question Sequence:**

In order to make the questionnaire effective and to ensure quality to the replies received, a researcher should pay attention to the question sequence in preparing the questionnaire. A proper sequence of questions reduces considerably the chances of individual questions being misunderstood. The question-sequence must be clear and smoothly moving, meaning thereby that the relation of one question to another should be readily apparent to the respondent, with questions that are easiest to answer being put in the beginning. The first few questions are particularly important because they are likely to influence the attitude of the respondent and in seeking his desired cooperation. The opening questions should be such as to arouse human interest. The following type of questions should generally be avoided as opening questions on a questionnaire:

Questions that put too great a strain on the memory or intellect of the respondent. Questions of a personal character.

Questions related to personal wealth etc.

Following the opening questions, we should have questions that are really vital to the research problem and a connecting thread should run through successive questions. Ideally, the question-sequence should conform to the respondent’s way of thinking. Knocking what information is desired, the researcher can rearrange the order of the questions (this is possible in case of unstructured questionnaire) to fit the discussion in each particular case. But in a structured questionnaire the best that can be done is to determine the question-sequence with the help of a pilot Survey, which is likely to produce good report with most respondents. Relatively difficult questions
must be related towards the end so that even if the respondent decides not to answer such questions. considerable information would have already been obtained. Thus question-sequence should usually go from the general to the more specific and the researcher must always remember that the answer to a give question is a function not only of the question itself, but of all previous questions as well. For instance, if one question deals with the price usually paid for coffee and the next with reason for preferring that particular brand, the answer to this latter question may be couched largely in terms of price differences.

3. **Question formulation and wording**

With regard to this aspect of questionnaire, the researcher should note that each question must be very clear for any sort of misunderstanding can do irreparable harm to a survey. Question should also be impartial in order not to give a biased picture of the true state of affairs. Questions should be constructed with a view to their forming a logical part of a well thought out tabulation plan. In general, all questions should meet the following standards. (a) should be easily understood, (b) Should be simple i.e., should convey only one thought at a time, (c) Should be concrete and should conform as much as much as possible to the respondent’s way of thinking. For instance, instead of asking. How many razor blades do you use annually the more realistic question would be to ask, how many razor blades did you use last week?

Concerning the form of questions, we can talk about two principal forms.

3.1 **Open-End Question**

Open-end questions allow respondents to answers in their own words. These questions take various forms. Generally speaking-Open-end question often reveal more because respondents are not constraints in their answers. Open-end question are specially useful in the exploratory stage of research where the researcher is looking for insight into how people rather than measuring how many people think a certain way.

Open-end method was chosen by me due to take full information about welfare provisions such as

1. Do you wish any more welfare scheme to be introduced?
2. In your opinion is the welfare schemes competitive enough with other public sectors?

3.2 **Close-End Questions**

Close-End Question pre-specify all the possible answers, and respondents make a choice among them. Close-End questions provide answers that are easier to interpret and tabulate it was very helpful to collection of data and respondent gives the answers very easily.

Therefore Close-End Question was chosen by me due to accurate response.

1. You joined BHEL for
   a) Good working environment  b) Higher Basic
   c) Large number of welfare schemes  d) any other reason

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2. The facilities in BHEL hospital are:
   a) Excellent   b) Above average   c) Average
   d) Below average  e) Bad

3. In case of serious illness you prefer:
   a) BHEL hospital   b) Government hospital
   c) Private hospital

Both types of questions as open-end and close-end were chosen for the study. Researcher has chosen open and close-end questions considering the free mindedness, quickness of moment and critical time management and staying conveniences of a employee.

Respondents (employee) can answer without having more time the accurate answer. Questions are related to welfare provisions especially for BHEL Jhansi. These questions are worthwhile to innovate and improve the business industry and know the emerging current problems of welfare ever else we have not got earlier.

4. SAMPLING

When a person takes a sip of tea to test whether it is hot enough or sweet enough. He is applying the concept of sampling. There are highly paid professional tea-tester and wine tester who after a sip assess the quality, vintage and more importantly the price of the harvest of the season. The technique of sampling is extensively used in industry and business. It is used in quality control in factories and in service of tourism industry.

The first step in any sampling operation is to define the universe of the population. The universe is the entire set or collection of items of one kind, which is to be studied for some characteristics called parameter. In sampling instead of examining all the items of the universe, may be one lakh in number, the researcher; check the characteristics of a representative tot of say, one thousand in order to save time and money. The small sample and the characteristic of the sample are known as the statistic. The methodology of drawing conclusions about the parameter of the workers from the static’s of the sample is called estimation. Sampling is used to find out the problem of labour welfare. Sampling was used to cover the all respondents to study the employee welfare is a task next to impossible and hence selected a sample of 60 Respondents.

This is the size of Sampling
60 Respondents (=) 10
600 Respondents (=) 00
=100% Response

A sample design is a definite plan for obtaining a sample from a given employees in BHEL Jhansi. It refers to the technique or the procedure that researcher would adopt in selecting employees for the sample. Sample design may as well lay down the number of items to be include in the sample i.e. Size of Sample, which was described above.
Sample design is determined before data collection. There are many sample design from which a researcher can choose. Some designs are relatively, more precise and easier to apply than other researcher will select a sample design, which will be reliable and appropriate for his research study.

5. **TYPE OF SAMPLING**
   There are many types of sampling.

1. **PROBABILITY SAMPLING**
   In probability sampling each element of the population has a fixed probability of being included in the sample. Probability sampling adheres to a specified system, which does not permit arbitrary or based selection.

2. **SIMPLE RANDOM SAMPLING**
   This gives each elements of the population an equal chance of being included in the sample. All other forms of probability use this basic concept. Two commonly used methods of simple random sampling are lottery method and Random number method.

3. **SYSTEMATIC SAMPLING**
   This requires as a first step, that the assessments of population be arranged in some order.

4. **STRATIFIED RANDOM SAMPLING**
   The basis for using stratified sampling is the existence of state within the population. A stratum can be conceived as a sub-population, which is more homogeneous than the complete population the elements of a stratum are similar to each other as they are homogeneous but they are different to the elements in other strata. The population is divided in to mutually exclusive groups (such as age group) and random sample is drawn from each group.

5. **CLUSTER SAMPLING**
   The population is divided into mutually exclusive groups and the researcher draws a sample of the groups to interview.

   Simple stated, it is a survey conducted on a group simultaneously. This reduces cost and time since the interviewer collects the information from all belonging to a group. Cluster may be selected on the basis of predetermined strata. Similarly the areas also could be grouped or clustered. However, there is harmonically an increase in sampling error due to deviation from the strictly random sample process.
6. **NON-PROBABILITY SAMPLING**

When time and cost factors limit the collection of sample or when only a rough estimate of a population is desired, non-probability approach may be appropriate. A few of the more common techniques are outlined. In these, it is not possible to estimate the probability of the inclusion of an element in the sample.

7. **CONVENIENT SAMPLING**

The researcher selects the most accessible population members from population to obtain information.

8. **JUDGEMENT SAMPLING**

The researcher use judgment to select population members who are good prospects for accurate information.

9. **QUOTA SAMPLING**

The researcher finds and interviews a prescribed number of people in each of several categories.

Probability and Non Probability both type of sampling has been used in survey considering the probable of welfare especially for the BHEL Jhansi.

The type of sampling design used by me in the survey was that of probability sampling (random) with respect to the representation basis and on the element selection basis. It is unrestricted sampling.

This survey was conducted only in BHEL Factory and that is too for limited population (Employees). Therefore the findings cannot be generalized at large without making adequate provisions for assumptions with respect to the mixed industry business conditions. While conducting a survey unavoidable errors crept in the from of biased answers from the employees, no response of the employees and sometime errors due to lack of knowledge of the respondents.

A. **Field Work**

Once the researcher has finalized the problem definition and research design steps, he must conduct the actual data collection. This steps is also called the field research. Data may be collected by two ways i.e.

1. **OBSERVATION**

The observation method is the most commonly used method especially in studies relating to behavioral science. Observation becomes a scientific tool the method of data collection for the researcher. When it serves a formulated research purpose is systematically planned and recorded and is objected to checks and controls on validity and of investigators own direct observation without asking from the action of respondents, either directly mixing with them or indirectly without getting mixed up with them. After revealing the purpose of study to the indirect observation researcher does not reveal the purpose of study and observe the former as a stranger.
In direct observation we tell the propose of study to the employees, whereas, in indirect observation, we don’t reveals the purpose of investigation to respondents. We tell it to the officers of BHEL and set down silently to note the employees’ behavior in BHEL Jhansi. As research set down to not actively of employees in BHEL Factory office.

2. **QUESTIONNAIRE**

   This method is really worthwhile to collect the data. Questionnaire is sent and distributed to the workers and officers concerned (i.e., sample) with respect to answer the return the questionnaire.

   A questionnaire consists of a number of questions printed or typed in a definite order.

   - No. of question should be small
   - Questions should be arranged logically
   - Questions should be short and simple to understand
   - Instruction to the informants
   - Ambiguous Questions ought to be avoided

2.1 **Advantage of Questionnaire**

Low cost even when the workers is large.

   - Free from the bias of interviewer, since answer is respondent’s own words
   - Adequate time is given to respondents to answer
   - Speedier than all other methods
   - Convenient to respondents.

2.2 **Disadvantages**

   - Low rate of return of the filled questionnaire.
   - Control over it can be last, once it sent.
   - There is a possibility of ambiguous replies.
   - It is slow method of data collection.
   - Two or three respondents in one day answer.

6. **INTERVIEW METHOD OF FIELD WORK**

1. **Personal Interviews**

Field work for personal interviews of the workers and officers. Research has a extra resources to collect the data and information as interviews.

2. **Structured Interviews**

Such interviews involved the use of a set of predetermined questions and of highly standardized techniques of recording. Thus interviewer in structured interview follows a rigid procedure laid down, asking questions in a form and order prescribed.
The interviewers is allowed much greater freedom to ask, in case of need, supplementary questions or time he/she may omit certain questions if the situation so requires. He may even change the sequence of questions. He has relatively greater freedom, while recording the response to include some aspects and exclude others.

3. **Unstructured Interviews**

It is characterized by a flexibility of approach to questioning. Unstructured interview does not follow a system of predetermined questions and standardized techniques of recording information. Unstructured interviews also demand deep knowledge and greater skill on the part of interviewer.

4. **Non-Directive Interview**

It is derived from the therapeutic or psychiatric interview. In this type of interviews, minimum direction is provided by the interviewer, and the respondent is given freedom to express his subjective feelings as fully and spontaneously as wishes.

5. **Focussed Interviews**

Focused interview is meant to focus attention on the given experience of the respondent and its effects. Under it the interviewer has the freedom to decide the manner and sequence in which the questions would be asked and has also the freedom to explore reasons and motives. The main task is to confine the respondents to a discussion of issues with which he seeks conversance such interviews are used generally in the development of hypothesis and constitute a major type of unstructured interviews.