Chapter 6

Research Design

Structure:

6.1 INTRODUCTION

Designing of the research is done mainly to solve the problem of getting the various stages of the research under control. This control factor is very important for the researcher during any of the research operation. Preparation of the design for the research forms a very critical stage in the process of carrying out some research work or a research project.

Research Design in general terms can be referred to as the scheme of work to be done or performed by a researcher during the various stages of a research project. With the help of the research design, one can very easily handle and operate research work as research design acts as a working plan, which is made by a researcher even before he starts working on his research project. By this, researcher gets a great help and guidance in achieving his aims and goals.

According to Russell Ackoff, "research design is the process of making decisions before a situation arises in which the decision has to be carried out. It is actually a process of deliberate anticipation directed towards bringing an unexpected situation under control."

6.2 MEANING AND DEFINITIONS

1. According to Trochim (2005), research design "provides the glue that holds the research project together. A design is used to structure the research, to show how all of the major parts of the research project work together to try and address the central research questions." The research design is like a recipe. Just as a recipe provides a list of ingredients and the instructions for preparing a dish, the research design provides the components and the plan for successfully carrying out the study.
2. According to Claire Seltiz, Research Design is a catalogue of the various facts relating to the formulation of a research effort. It 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.
3. According to Paul E. Green and Tull, a Research Design is the specification of methods and procedures for acquiring the information needed. It is the overall operational pattern or

framework, of the project that stipulates what information is to be collected from which sources by what procedures. If it is a good design, it will ensure that the information obtained is relevant to the research questions and that it was collected by objective and economical procedures.

Research Design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance. The plan is the overall scheme or programme of research. It includes an outline of what the investigator will do from writing the hypotheses and their operational implications to the final analysis of the data. To structure the research is to outline the scheme and paradigm of the operations of the variables strategy. It includes the methods to be used to gather and analyse the data. In other words, strategy implies how the research objectives will be reached and how the problems encountered in the research will be tackled. Like an architect prepares a blueprint before he approves a construction – in the same way researcher makes or prepares a plan or a schedule of his own study before he starts his research work. This helps the researcher to save time and also save some of his crucial resources. This plan or blueprint of study is referred to as the research design. A detailed outline of how an investigation will take place.

6.3 ESSENTIALS OF GOOD RESEARCH DESIGN

(**1**) **Reliability:** In general, reliability is concerned with the question of whether the results of a study are repeatable. It is an indication of the ability of a system to perform and maintain its functions consistently in routine circumstances as well as hostile or unexpected circumstances. Reliability is particularly important in quantitative research and may refer to:

- The statistical reliability of a set of data.
- The experimental reliability of an experiment.
- Data reliability, a property of some disk arrays in computer storage.
- Reliability engineering ensures a system will be reliable when operated in a specified manner.
- Reliability theory, as a theoretical concept, to explain biological aging and species longevity.
- Reliability (computer networking) is a category used to describe protocols.

(2) Replication: It is sometimes necessary for researchers to replicate (*i.e.* reproduce or duplicate) the findings of others; in order for this to happen, a study must be replicable. A study must be replicable in order that the reliability of a measure or a concept can be determined. Replications should not be confused with repeated measurements which refer literally to taking several measurements of a single occurrence of a specific phenomenon.

(3) Validity: Validity is concerned with the integrity of the conclusions that are generated from a piece of research. A valid measure is one which is measuring what it is supposed to measure. A valid measure must be reliable, but a reliable measure need not be valid. Validity refers to obtaining results that accurately reflect the concept being measured and it implies reliability (consistency). The main types of validity that are typically distinguished include:

- Measurement (or construct) validity, *e.g.*, does an IQ test really measure variations in intelligence?
- Internal validity, *e.g.*, if we suggest that x causes y, can we be sure that it is x that is responsible for the variation in y and not something else?

- External validity, *e.g.*, can the results of a study be generalised beyond the specific research content?
- Ecological validity, *e.g.*, are social scientific findings applicable in people's everyday, natural social settings?

6.4 STEPS OF RESEARCH DESIGN

Following are the steps in research design:

1. **The Problem**: The first step involves the proper selection and then carefully defining the problem. By this researcher will be enabled to know about what he has to search, but it should be kept in mind that the problems selected should not be unmanageable in nature and should also not be based on desires.
2. **Objective of the Study**: The objective should be very clear in the mind of the researcher as this will lead to the clarity of design and proper response from the respondents.
3. **Nature of the Study**: The research design should be very much in relation with the nature of the study, which is to be carried out.
4. **Data Sources**: The various sources of the data or the information should be very clearly stated by the researcher.
5. **Techniques of Data Collection:** For the collection of the required information, it sometimes becomes very necessary to use some special techniques.
6. **Social Cultural Context**: Research design based on the social cultural concept is prepared in order to avoid the various study variations.
7. **Geographical Limit**: This step becomes a necessity at this point of time as with the help of this step, research linked to the hypothesis applies only to certain number of social groups.
8. **Basis of Selection**: Selecting a proper sample acts as a very important and critical Step and this is done with the help of some mechanics like drawing a random stratified, deliberate, double cluster or quota sample etc.
9. **Data Analysis:** Analysis of data is a process of inspecting, cleaning, transforming, and modeling data with the goal of highlighting useful information, suggesting conclusions and support decision making.
10. **Data Interpretation:** Data interpretation can be defined as "the application of statistical procedures to analyze specific observed or assumed facts from a particular study".
11. **Conclusions and Recommendations:** Conclusion means a position or opinion or judgment reached after consideration. On the basis of the research findings the conclusion needs to be drawn and suitable recommendations should be made to help improve the research problem.

6.5 EVALUATION OF RESEARCH DESIGN

The research design must be good. The question of good design is related to the purpose or objective of the research problem and also with the nature of it the problem to be studied.

A good design is often characterized by features like flexibility, appropriateness, economical and so on. Generally, the design which minimizes bias and maximizes the reliability of the data collected and analysed is considered a good design. The design which gives the smallest experimental error is supposed to be the best design in many investigations. Similarly, a design which yields maximal

information and provides an opportunity for considering many different aspects of a problem is considered most appropriate and efficient design in respect of many research problems. A design may be quite suitable in one case, but may be found wanting in one respect or the other in the context of some other research problem.

The fundamental questions in evaluating a research design pertain to the precision, reliability and relevance of the data and their analysis. Before actually carrying out research, it is better if the researcher evaluates his research design. This can be achieved if he verifies the following aspects for their explicitness.

- How relevant are the objectives?
- How relevant are the hypotheses?
- How explicit are the hypotheses?
- Have the problems and hypotheses been stated in operational terms scientifically?
- Has the research plan been presented in detail so that its logic is apparent?
- How scientific is data collection tool?
- How scientific is method of data collection?
- How precise are the observations?
- Can other investigators repeat the observations?
- Do the data actually satisfy the demands of the problem, i.e., do they actually demonstrate the conclusion?
- Does the research design ensure a comparison that is not subject to the alternate interpretations?
- Are the statistical designs appropriate?

6.6 QUESTIONS

1. Explain the Essentials of a good research design.
2. Explain the important steps involved in a research design?
3. Explain the process of Evaluation of a good research design.
4. Explain the significance of a good research design.

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