Research Design

(BA (JMC) 303)

Unit – 3

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2023

LESSON 1: Research Design

Introduction: Research Design

- In a systematic research, the researcher needs to follow a research design.
- Research design is like **a house map which explains the elements involved in the process of research.** In a research process, hypothesis is the assumption or a prediction that a researcher makes on the basis of the extensive literature survey conducted by the researcher. Proving the hypothesis is the main purpose or objective of any research findings. Hypothesis must be ready for testing. A working hypothesis results in a successful research work.

Meaning of Research Design

- Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitutes a research design.
- Research design is a pattern by which data related to research work is collected and analysed to get solution of research problem.
- After deciding the research topic, identification of specific problems and working out objectives of the research, research design should be prepared. It helps in research by clarifying about the study, the type of data required, the purpose and its scope, the sources for data collection, the study locale, the time, materials and samples required, the method of data collection and its analysis.

Need for Research Design

- **Research design is needed because:**
  - It facilitates the smooth sailing of various research operations, thereby making research as efficient as possible.
  - Research design has a great bearing on the reliability of the results arrived at and as such constitutes the firm foundation of the entire edifice of the research work.
  - The research design helps the researcher to organize his ideas in a form whereby it will be possible for him to look for flaws and inadequacies.

Types of Research Design

There are primarily two types of research design used viz., cross sectional design and longitudinal research design.

Cross Sectional Design:

- It involves the collection of information from any given sample of population elements "only once". Cross sectional designs are of two types: Single Cross Sectional: in the single cross sectional design, only one sample of the respondents is drawn from the target population and information is obtained from this sample only once. Multi Cross Sectional: In multi cross sectional, there are two or more samples of respondents and information from each sample is obtained only once.

Types of Research Design

Longitudinal Design

- It is a form of correlation study. That tries to correlate subjects either in ascending or descending order. It is also called as Vertical Study. It involves intense observation of the same variable over a long period of time. Here, a fixed sample (s) of population element is measured repeatedly on the same variables. The sample remains the same over time and same variables are measured.

Variables: Meaning and Types

- A concept which can take on different quantitative values is called a variable. Weight, height, income are all examples of variables.

Types of Variables

- **Continuous Variable:** Phenomenon which can take on quantitatively different values even in decimal points called „continuous variables". A continuous variable is that which can assume any numerical value within a specific range. E.g. Age
- **Discrete Variable:** Variables which can only be expressed in integer values are called non–continuous or discrete variables. A variable for which the individual values fall on the scale only with distinct gaps is called a discrete variable. If age is an example of continuous variable, number of children is an example of discrete variable.

Types of Variables

- **Dependent Variable:** If one variable depends upon or is a consequence of the other variable, it is called dependent variable.
- **Independent Variable:** the variable that is antecedent to the dependent variable is termed as an independent variable. For example, if we say, that height depends upon age, the height is a dependent variable and age is an independent variable or if in addition to being dependent upon age, height is also dependent on gender, then height is a dependent variable and age and gender are independent variables.
- **Extraneous Variables:** Independent variables that are not related to the purpose of the study, but may affect the dependent variable are termed as extraneous variables. For example, suppose the researcher wants to test the hypothesis that there is a relationship between children"s gain in social studies achievement and their self concepts. In this case self concept is an independent variable and social studies achievement is a dependent variable.

Extraneous Variables: Contd..

- Intelligence may as well affect the social studies achievement but since it is not related to the purpose of the study undertaken by the researcher, it is termed as extraneous variable. A study must always be so designed that the effect upon the dependent variable is attributed entirely to the independent variable and not to some extraneous variable.
- Confounded Relationship: when the dependent variable is not free from the influence of extraneous variable (s), the relationship between dependent and independent variables is said to be confounded by extraneous variables.

Research Design in Descriptive and Diagnostic Research Studies

- **The research design in such studies must focus attention on the following:**
  - Formulating the objective of the study
  - Designing the methods of data collection
  - Selecting the sample
  - Collecting the data
  - Processing and analyzing the data
  - Reporting the findings

Meaning of Hypothesis

- Hypothesis is an unproven statement or proposition about a factor or phenomenon that is of interest to the researcher. It is a specific statement of prediction.
- It describes in concrete or definite terms what you expect will happen in your study rather than theoretical.
- It consists either a suggested explanation for a phenomenon or of a reasoned proposal suggesting a possible correlation between multiple phenomenon. For example, Automobile A is performing better than Automobile B.
- Research hypothesis is a predictive statement capable of being tested by scientific methods that relates an independent variable to some dependent variable.

Types of Hypothesis

- **Null Hypothesis:** A null hypothesis is always the hypothesis that is tested. It is a statement of the status quo, one of no difference or no effects. It should always be specific hypothesis.
- **Alternative Hypothesis:** This is the one in which some difference or effect is expected. It is opposite of null hypothesis. For example, if we assume that method A is better than method B. in research, the null hypothesis is formulated in such a way that its rejection leads to the acceptance of Alternative hypothesis.

Characteristics of Hypothesis

- It should be clear and precise.
- It should be capable of being tested.
- It should be limited in scope.
- It should be specific.
- It should be consistent with most known facts i.e. it must be consistent with a substantial body of established facts.
- It should explain the facts that gave rise to the need for explanation.

LESSON 2 Research Methods: Survey

- Surveys are conducted in descriptive research. Survey type research method usually have larger samples however the percentage of responses generally happens to be low, as low as 20 to 30%, especially in mailed questionnaire studies.
- The survey method gathers data from a relatively large number of cases at a particular time; it is essentially cross sectional. Surveys are concerned with describing, recording, analyzing and interpreting conditions that either exist or existed. They are primarily concerned with the present but at times do consider past events and influences as they relate to current conditions. Therefore, in surveys, variables that exist or have already occurred are selected and observed.

Characteristics of Survey

- Specific Objectives: The first step in conducting a survey is to list down straight objectives of the survey. A survey without clear goals will not yield desired results.
- Straightforward Questions: The survey must consist of straightforward questions which are constructed in a simple and crisp manner. It is important for the respondents to understand the questions listed in the survey. Confusing and ambiguous questions may disinterest the respondents.
- Proper Sample: It is not necessary to survey the entire population. It is important to capture responses from the selected representative of the entire population. It is important to ask the right respondents rather than asking every person.

Characteristics of Survey

- Reliable and Valid: It is important for the respondents to be authentic and the information provided by them valid. Otherwise, the objective behind conducting the survey is lost.
- Accurate Reporting of Result: Survey results must be carefully analyzed. In order for the report to be accepted by the target audience, it must be fair, true and accurate. Credible reports include both negative and positive results.

Types of Survey

- Surveys are classified according to their focus and scope (census and sample surveys) or according to the time frame for data collection (longitudinal and cross-sectional surveys).
- A survey that covers the entire population of interest is referred to as a census. In research, however the population is used to refer to the entire group of individuals to whom the findings of a study apply. The researcher defines the specific population of interest. Classifying surveys on the basis of their scope and their focus gives four categories:
- A census of tangibles: One seeks information about a small population, such as a single school, and when the variables are concrete, there is little challenge in finding the required answers.

Types of Survey Contd..

- A census of intangibles: One seeks information about constructs that aren"t directly observable but must be inferred from indirect measures. Such constructs may include pupil achievement or aspirations, teacher morale, parents" attitudes toward school, or the achievement testing program carried out by most schools.
- A sample survey of tangibles: One seeks information about large groups. Sampling techniques are used and the information collected from the sample is used to make inferences about the population as a whole.
- A sample survey of intangibles: One seeks information about constructs that aren"t directly observable but must be inferred from responses made by the subjects to questionnaires or interviews. For example, how someone is going to vote is intangible, but what is marked on a ballot is tangible.

Five Basic Steps Involved in Survey

- **Planning:** Survey research begins with a question that the researcher believes can be answered most appropriately by means of the survey method. The researcher needs to decide on the data-gathering technique that will be used.
- **Sampling:** The researcher must make decisions about the sampling procedure that will be used and the size of the sample to survey. If one is to generalize the sample findings to the population, it is essential that the sample selected be representative of that population.
- **Constructing the Instrument:** A major task in survey research is the construction of the instrument that will be used to gather the data from the sample.

- **Conducting the Survey:** Once the data-gathering instrument is prepared, it must be field-tested to determine if it will provide the desired data. Also included in this step would be the training of the users of the instrument, interviewing subjects or distributing questionnaires to them, and verifying the accuracy of the data gathered.
- **Processing the Data:** The last step includes coding the data, statistical analysis, interpreting the results, and reporting the findings.

Content Analysis

- Earl Babbie defines Content Analysis as "the study of recorded human communications, such as books, websites, paintings and laws". Content analysis is considered a scholarly methodology in the humanities by which texts are studied as to authorship, authenticity, or meaning.
- Content Analysis is sometimes also referred to as textual analysis. It majorly deals in analysing the published content which may assist the researcher in developing the content for research purpose.

Content Analysis

- The method of content analysis enables the researcher to include large amounts of textual information and systematically identify its properties, such as the frequencies of most used keywords by locating the more important structures of its communication content. Such amounts of textual information must be categorised to provide a meaningful reading of content under scrutiny.

Uses of Content Analysis

- Content Analysis is used to make inferences about the antecedents of a communication.
- Content Analysis is used to describe and make inferences about characteristics of a communication.
- Content Analysis is also used to generate inferences about the effects of a communication strategy.
- Content Analysis is also used in the context of basic communication paradigm.
- Content Analysis is a valuable tool for applied researchers and communication practitioners.

Case Study Method

- Sometimes the researcher has limited time and money. In such circumstances, the researcher uses secondary data collection techniques like case studies. Secondary data is easily available and saves a lot of money and time.
- It is a very popular form of qualitative analysis and involves a careful and complete observation of a social unit,(a person, a family, an institution, a cultural group or entire community).It is a method of study in depth rather than breadth.
- Case study is essentially an intensive investigation of the particular unit under consideration. The object of the case study method is to locate the factors that account for the behaviour–patterns of the given unit as an integrated society.

Characteristics of Case Studies

- Under this method the researcher can take one single social unit or more of such units for his study purpose; he may even take a situation to study the same comprehensively.
- Here, the selected unit is studied intensively i.e. it is studied in minute details. Generally, the study extends over a long period of time to ascertain the natural history of the unit so as to obtain enough information for drawing correct inferences.
- Research approach is qualitative. Mutual inter–relationship of causal factors is studied. Behaviour pattern of the concern unit is studied directly and not by indirect or abstract approach.

Advantages of Case Study Method

- Enables to understand fully the behavioUr pattern of the concerned units.
- Useful in obtaining a real and enlightened record of personal experiences which would reveal man"s inner strivings, tensions and motivations that drive him to action along with the forces that direct him to adopt a certain pattern of behaviour.
- Trace out history.
- Intensive study
- Helpful in constructing questionnaire, document, study reports etc. Also called “mode of organizing data”
- Emphasis of historical analysis.
- Enhances the experience of the researcher and this in turn increases his analyzing ability and skill.

Sampling

Meaning of Sampling

- It is an act, process or technique of selecting a representative part of a population for the purpose of determining parameters or characteristics of the whole population.
- Population is the aggregate of all the elements that share some common set of characteristics and that comprise the universe for the purpose of research problem.

Sampling (Contd..)

Sample:

- A sample is a sub group of the element of the population selected for the participation in the study. Sample characteristics, called statistics are then used to make inferences about the population parameter.

Sample Design:

- A sample design is a definite plan for obtaining a sample from a given population. It refers to the technique or the procedure that the researcher would adopt in selecting items for the sample.

Census: a census is a complete enumeration of the elements of a problem.

Criterion of selecting a sample

Two costs are involved in a sampling analysis:

- The cost of collecting the data
- The cost of an incorrect inference resulting from the data
- The two causes of incorrect inferences are systematic bias and sampling error. Systematic bias results from errors in sampling procedures, and it cannot be reduced or eliminated by increasing the sample size.

Characteristics of a Good Sample Design

- Sample design must result in a truly representative sample.
- Sample design must be such which results in a small sampling error.
- Sample design must be viable in the context of funds available.
- Sample design must be such so that systematic bias can be controlled in a better way.
- Sample design should be such that the results of the sample study can be applied, in general, for the universe with a reasonable level of confidence.

Types of Sampling

Broadly there are two types of sampling:

- Non Probability Sampling
- Probability Sampling

Non Probability Sampling

- It does not afford any bias for estimating the probability that each item in the population has of being included in the sample.
- It is also called deliberate, purposive and judgment sampling
- The researcher deliberately selects the items of his choice.
- In such a design, personal element has a great chance of entering into the selection of the sample.
- There is always a danger of bias.
- Sampling errors cannot be estimated. It is very convenient and is relatively inexpensive

Types of Non Probability Sampling

- **Convenience Sampling** If a researcher wishes to secure data from, say, gasoline buyers, he may select a fixed number of petrol stations and may conduct interviews at these stations. This would be an example of convenience sample of gasoline buyers. At times such a procedure may give very biased results particularly when the population is not homogeneous. On the other hand, in judgment sampling the researcher"s judgment is used for selecting items which he considers as representative of the population. For example, a judgment sample of college students might be taken to secure reactions to a new method of teaching.

Types of Non Probability Sampling

- **Quota Sampling**: In stratified sampling the cost of taking random samples from individual strata is often so expensive that interviewers are simply given quota to be filled from different strata, the actual selection of items for sample being left to the interviewer"s judgment. This is called quota sampling. The size of the quota for each stratum is generally proportionate to the size of that stratum in the population. Quota sampling is thus an important form of nonprobability sampling. Quota samples generally happen to be judgment samples rather than random samples.

Probability Sampling

- It is also called random sampling or chance sampling. Under this, every item of the universe has an equal chance of inclusion in the sample. e.g.: a lottery.
- Probability or random sampling states that if on an average the sample chosen is a random one, the sample will have the same composition and characteristics as the universe.
- It is the best technique of selecting a representative sample.
- Random sampling allows each element in the population an equal probability of getting into the sample and all the choices are independent of one another.
- It gives each possible sample combination an equal probability of being chosen.

Types of Probability Sampling Designs

- **Systematic Sampling** In some instances, the most practical way of sampling is to select every nth item on a list.
- For example, if a 4% sample is desired, then 1st item would be selected randomly from the 1st 25, thereafter every 25th item would be included in the sample. In this samples are selected systematically at fixed intervals or for example, if there are 100000 elements in a population and sample of 1000 is desired, therefore sample interval is equal to 100000/1000= 100. Random number between 1 to 100 is selected, says 23, therefore samples selected are 23, 123,223,323,423,523...

Types of Probability Sampling Designs

- **Stratified Sampling** If the population from which a sample is drawn does not constitute a homogeneous group, stratified sampling technique is generally applied.
- Under stratified sampling, the population is divided into several sub – population called „strata". This population is more homogeneous. Then we select items from each stratum to constitute a sample. Since each stratum is more homogeneous than the total population, we are able to get more precise estimates for each stratum and by estimating more accurately each of the component parts, we get a better estimate of the whole. This type of sampling is more reliable and detailed information. Strata should be formed on the basis of common characteristics of the items to be put in each stratum.

Types of Probability Sampling Designs

- **Cluster Sampling** The target population is divided into mutually exclusive and exhaustive clusters. Then a random sample of clusters is selected, based on probability technique usually, Simple Random Sampling. For each selected cluster, either all elements are included in sample or a sample of element is drawn probabilistically. If the cluster happens to be geographic sub – division, in that case cluster sampling is better known as Area sampling. To understand cluster sampling, let us read an example, if there are 200000 machine parts in the inventory at a given point, stored in 400 cases of 50 each. Using cluster sample, we would consider the 400 cases as cluster and randomly select „n" cases and examine all the machine parts in each randomly selected case.

LESSON 4: Data Collection Tools

- Data collection is one of the most important steps in research process.
- Every researcher has to collect data to analyse it and test the hypothesis.
- Data is the raw material collected, which once processed becomes information.
- The primary difference between data and information is that data is raw, unprocessed whereas information is processed data. Also, data is impersonal whereas information is personal.
- Data can be used to generate varied information.
- Data collection begins after a research problem has been defined and research design is chalked out. Data is of two type viz. Primary Data and Secondary Data.

Primary Data

- Primary data is the first time collected data by the researcher.
- It is the first hand data collected for research purpose. It involves field work by the researcher. It is a tedious task and very time consuming. Though it is difficult to collect primary data, it is the most authentic data collected by the researcher.
- Primary data is fresh and updated. It is believed to be most accurate.
- The researcher may use several tools and techniques to collect primary data like interview, observation, questionnaire and survey. Collecting primary data is also expensive. It may also involve huge cost in training representatives of the researcher.

Characteristics of Primary Data

- It is freshly collected data by the researcher which means it is the first hand data collected.
- It is expensive
- It requires the researcher to personally collect Data through various tools of Data Collection.
- It is time consuming.
- It is the most accurate.
- It is not easily available .
- It seldom requires cross checking as it is collected by the researcher himself.

Collection of Primary Data

- For various research Primary Data can be collected with the help of different tools. For example, while doing an experimental research, Primary Data is collected by doing experiments as done in clinical laboratories. In the case of descriptive research, surveys are performed like the sample surveys and census survey, for example, the National Sample Survey Office, an organization under the Ministry of Statistics of the Government of India conducts regular Socio- Economic surveys. Primary Data can also be obtained through a simple mechanism of Observation.
- Another commonly used tool for collecting Primary Data, is the Questionnaire tool. Questionnaire is a set of questions prepared by the researcher to be filled in by the respondents with the objective of finding solutions to the problem listed by the researcher.

Collection of Primary Data

- Another common tool of collecting Primary Data is the Interview method. It is a method which involves presentation of oral- verbal stimuli and reply in terms of oral–verbal responses. This method can be used through personal interviews and also through telephone and e–mails.

Secondary Data

- Secondary data on the other hand is the data which is already available. The researcher uses books, internet, case studies, journals, periodicals which are already available to do the research work. In comparison to primary data, collecting secondary data is less tedious and less time consuming. Secondary data is also not very credible. It may also be old. Depending upon secondary data is not always a good idea.

Characteristics of Secondary Data

- Readily available
- Less Tedious
- Less Time Consuming
- Less Expensive
- Risky

Collection of Secondary Data

- The main tool for collecting Secondary Data is the case study method. This method is a popular form of Qualitative analysis and involves a careful and complete observation of a social unit. It is majorly done for descriptive research.

Questionnaire Method

- A questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms.
- The questionnaire is mailed to respondents who are expected to read and understand the questions and write down the reply in the space meant for the purpose in the questionnaire itself.
- It is most extensively used in various economic and business surveys. Therefore, it can be said that Questionnaire Method is used for big enquiries.
- The questionnaire has to be filled by the respondent himself. The questionnaire is either mailed or given in person to the respondents.

General Format of Questionnaire

- **Structured Questionnaires:** are those questionnaires in which there are definite, concrete and pre-determined questions. The questions are presented with exactly the same wording and in the same order to all respondents. The form of the question may be either closed i.e. of the type „yes" or „no" or open i.e. which invites free response but should be stated in advance and not constructed during the questioning.
- **Unstructured Questionnaire**: On the other hand, in an unstructured questionnaire, the interviewer is provided with a general guidelines 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 the respondent"s own words to the extent possible; in some situation tape recorders may be used to achieve this goal.

Schedule Method

- There are times when the research has to be conducted on a large scale and requires information from both literates and illiterates. In such a case the researcher uses the Schedule method in which a set of questions are prepared which are then filled by a trained middleman called the enumerator on behalf of the respondent. It is an expensive and time taking method which involves training. It is very much like the collection of data through questionnaire. The only **difference is that the schedules are filled by the enumerators who are especially appointed for this purpose.** These enumerators alongwith schedules go to the respondents, put to them the questions from the proforma in the order the questions are listed and record the replies in the space meant for the same in the proforma.

Observation Method

- Observation method is the most commonly used method in studies related to behavioural sciences. In a formulated research purpose is systematically planned and recorded and is subjected to checks and controls on validity and reliability. Here, observation method is used and it becomes a scientific tool. The information obtained under this method relates to the current happenings and not complicated by either the past behaviour or future intentions or attitudes. This method is independent of respondents" willingness to respond and as such is relatively less demanding of active cooperation on the part of respondents as happens in the case of interview or the questionnaire method. This method is particularly suitable in studies which deal with respondents who are not capable of giving verbal reports of their feelings for one reason or the other.

Interview Method

- One of the most used tools for Primary Data Collection is the Interview method. This method establishes a direct or indirect contact between the researcher and the respondent. It gives an opportunity to generate instant questions which may add to the knowledge of the researcher. The interview method of primary data collection involves presentation of oral – verbal stimuli and reply in terms of oral – verbal responses. This method can be used through personal interviews and also through telephone and e – mails. In the Interview method a set of questions is prepared by the researcher for the respondents. These questions are prepared with the objective of finding the possible answers to the Research question. There are three types of interviews conducted by the researcher for Data Collection; Personal, telephonic and through e – mails.

Focused Group Discussion Method

- When group interviewing is done for understanding respondent"s behaviour in a holistic manner and other research tools such as schedule are used. It is regarded as a research method. In this research method group discussion is conducted by the researcher with the respondents on a research problem. It is a common research procedure in electronic media research such as format and programming changes, personalities, station images, and lifestyle characteristics of the respondents. There is also an extended focus group procedure used by professional researchers, in which respondents are required to complete a written questionnaire before the group discussion begins. This procedure is taken into practice to eliminate one major problem created by group, namely the person who does not wish to offer an opinion because (s)he is in a minority.