Data Collection Techniques

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Abstract *- The planning phase of the research comprises of problem formulation, developing a research design, a sampling design and a set of measurement scales. The next stage is of data collection, which may be of qualitative or quantitative nature. The amount of data available to a researcher is generally plentiful and he faces a data explosion. To wade through this sea of data the researcher should be aware of how to critically evaluate the data and decide on the relevant data.*

Meaning of Research **-** Research is the pursuit for knowledge. It may also be described as a planned, methodical study of materials and objects with the goal of establishing facts and drawing novel conclusions. Consequently, research is a voyage of discovery.

Dictionaries describe it as careful search or inquiry, Endeavour to discover new ideas by scientific study - a course of critical investigation.

zina ' o leary has defined research as "a creative and strategic thinking process that involves constantly reassessing and making decisions about the best possibile means for obtaining trustworthy information carrying out appropriate analysis and tracing credible solutions."

Techniques of Data Collection –

A collection of facts, numbers, items, symbols, and occurrences compiled from various sources is called data. Researchers use a variety of techniques to gather data in order to make better decisions. They need data to make informed decisions, which is why data is gathered from various audiences at different times. After a research problem has been identified and a study strategy or plan has been developed, the work of gathering data begins. ***Primary and secondary data*** are two categories of information that the researcher should consider while choosing the data gathering strategy for the study. The primary data are those that are newly gathered, unique in nature, and collected for the first time. On the other hand, secondary data are those that have previously been gathered and subjected to statistical analysis by another party. In order to choose the best data collection strategy, the researcher must first choose what kind of data he will use for his study. A range of strategies and instruments are used in data collection methods to get both quantitative and qualitative information. These techniques guarantee accurate and thorough data collecting and are essential to the data collection process. In order to quantify events and trends, quantitative data collection methods use methodical techniques to gather numerical data, such as surveys, polls, and statistical analysis.

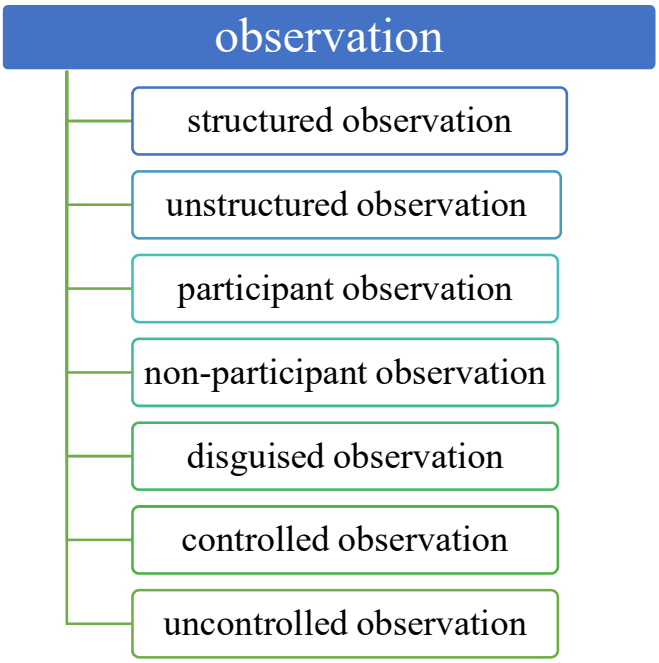
On the other hand, qualitative data collecting techniques emphasize gathering non-numerical data through focus groups, interviews, and observation in order to gain a better knowledge of attitudes, actions, and motives.

By combining quantitative and qualitative data collecting methods, companies may improve their datasets and obtain a thorough understanding of intricate events. Ensuring the quality and reliability of data obtained may be achieved via the effective usage of data gathering methods and processes, which in turn supports strategic planning and informed decision-making.

Collection of Data Through Observation Method

The observation method is the most commonly used method specially in studies relating to behavioural sciences. In a way we all observe things around us, but this sort of observation is not scientific observation. The most popular approach, particularly in research on behavioral sciences, is observation. While we are all observers in some sense of the world, this kind of observation is not the same as scientific observation. When observation is used to gather data for a planned study project, is meticulously organized, documented, and subjected to validity

and reliability tests and controls, it becomes a scientific instrument for the researcher.



With the observation approach, the investigator obtains information by direct observation without making any requests of the responder. If proper observation is made, one of the key benefits of this approach is the elimination of subjective bias. This method is particularly suitable in studies which deal with subjects who are not capable of giving verbal reports of their feelings for one reason or the other.

Structured observation - Structured observation is organised and planned which employs formal procedure. The units to be observed have to be carefully defined. It is also necessary to define the information to be recorded, selection of data and standardisation of conditions of observation; the observer is supposed to be knowing the situation and therefore need to prepare specific plan for collection and recording the data. In this type, the categories of observation have to be developed. It is subjected to high levels of control and differentiation.

Unstructured observation - The unstructured observation is contrasting to the above situation. The participant observation could be of this type as the observer may have to observe many things for longer time and may not be able to structure his program. Further, he will depend on the natural situation, which is not in his control and difficult to structure. However, the researcher should decide the relationship between him and the group; the period of observation; type of behaviour to be observed, etc.

Participant observation – The observation which involves the person which is being observed that kind of observation is called participant observation. In participant observation, the purpose is to get an in-depth understanding of the group or community being studied. It helps in building trust between the observer and the observed.

Non participant observation – when the sample person is completely unaware about that he is being observed by someone for the purpose of study that is called non participant observation.

Disguised observation – when the observer is observing in such a manner that his presence may be unknown to the people he is observing, such an observation is described as disguised observation.

Controlled observation – when the observation takes place in artificial environment and in pre planned atmosphere that is called controlled observation.

Uncontrolled observation – when the observation takes place in natural setting and completely unplanned that observation is called uncontrolled observation.

Observation requires proper planning and preparation of mindset of the person who is going to observe. Following are ***the requisites of good observation*** –

Planning for observation – the factors one must consider in details hile planning to employ observation as a research technique are

1. Units of the behavior to be observed.
2. An appropriate subject to be observed.
3. Scope of observation – individual or group.
4. Preparation of proper toll for recording of observation.
5. Getting oneself trained in terms of expertness as an observer.

- ***Execution of observation*** – A good observation plan may not lead to success unless it is followed up with skill and resourcefulness. An expert execution demands –
  - Proper arrangement of special conditions for subjects.
  - Assuming the proper physical position for observing.
  - Handling well the instrument of recording data to be used.
  - Utilizing the training received in terms of expertness.

- ***Recording and interpreting observation*** - the two common procedure for recording observations are -

simultaneous, i.e. when he observer goes on recording his observtion simultaneously with the occurance of the phenomena observed as in time sampling.	soon after the observation, i.e. when the observer undertakes to record his observation not simultaneously with his actual observation process, but immediatly after he has observed for a unit of time, while the details are still fresh in his mind.

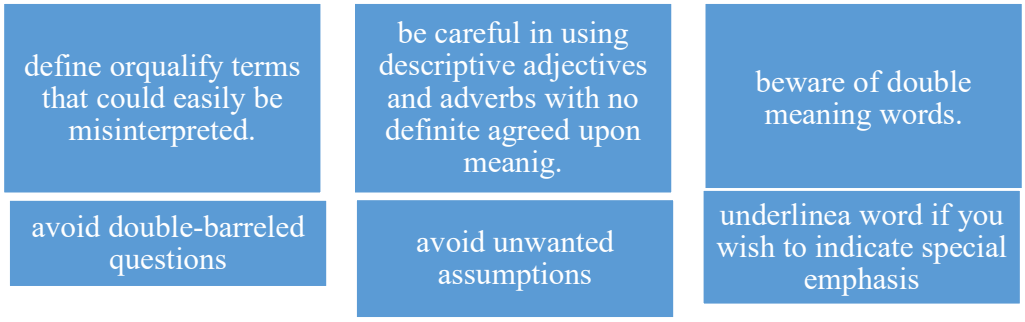
For a systematic collection of data through observation, the devices of recording often used are -

- *Heck lists*
- *Rating scale*
- *Score cards*
- *Scaled specimens*
- *Black forms for tallying frequencies.*

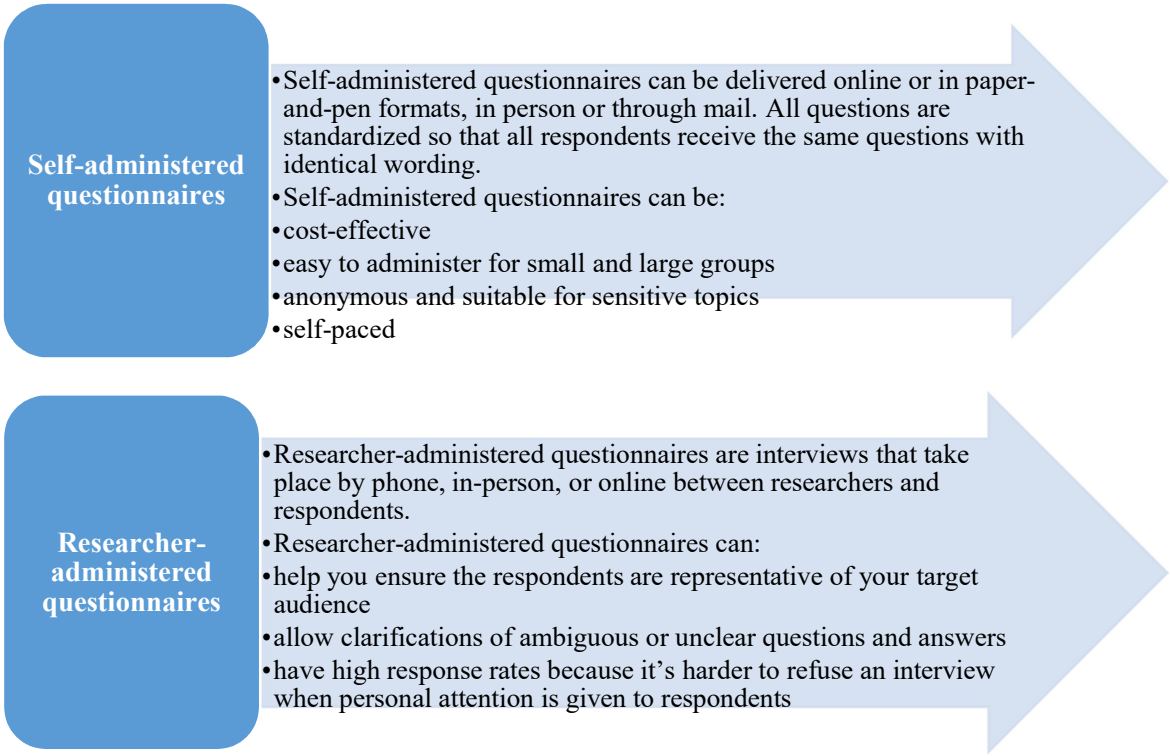
Collection of Data Through Questionnaire

A **questionnaire** is a list of questions or items used to gather data from respondents about their attitudes, experiences, or opinions. Questionnaires are used for both qualitative and quantitative purpose. Questionnaires are commonly used in market research as well as in the social and health sciences.

Principles of good questionnaire -



Questionnaire can be of two types -



Construction of a questionnaire

✓ Study other questionnaires and keep in mind the characteristics of a good questionnaire.

✓ Get all the help you can and make all preparation for planning and constructing questionnaire.

- ✓ Submit your designed questionnaire items for criticism to your friends and colleagues.
- ✓ Check the validity and reliability of questionnaire two three times.

Collection of Data Through Survey Method

Surveys are incredibly versatile research tools. You can use them to reach your target audience to get actionable, reliable data. Surveys help you with gathering, measuring, and in some cases, analyzing data from your desired sources. Data you collect from survey responses is primary research data, and as such, it is the most reliable and accurate research data for any project. Collecting data with surveys is a useful way to gather accurate information about both large and small groups that can be used to draw conclusions and inform important decisions.

Online surveys - Online questionnaires are the most popular, least expensive, and most efficient way to collect data. With Survey makers, you can easily create your survey, distribute it to your target audience, collect responses, and analyze data, all within one easy-to-use tool.

Paper surveys - Paper surveys include any type of surveys handed directly to participants to fill out manually (field research) and surveys that are mailed to participants.

Phone surveys - Telephone interviews are yet another way to survey your target market. They provide a more personal touch to your data collection, and trained.

In-person surveys - Face-to-face data collection can be an effective method for data collection. For example, if your participant needs to view or interact with a product, an in-person survey is necessary.

Types of Survey Data

Qualitative survey data	Quantitative survey data

Qualitative survey data - Qualitative data comes in the form of words, sentences, and phrases. It provides insight into your respondents' opinions, attitudes, impressions, and behaviors. The data is completely subjective and is provided in the respondents' own words.

Quantitative survey data - Quantitative data is expressed in numbers, quantities, and values. The hard data provides concrete findings. It is measurable, objective, and reliable. The data is collected through surveys with a variety of closed-ended questions. Quantitative data is useful in measuring trends over time, creating benchmarks, and proving or disproving hypotheses. This type of survey data is easier to analyze but generally requires a larger sample size to come to a credible conclusion.

Collection of Data Through Experimentation

The **experimental method of data collection** involves conducting controlled experiments to study cause-and-effect relationships between variables. In this method, researchers manipulate one or more independent variables to observe their effects on a dependent variable. The participants or subjects are randomly assigned to different groups or conditions to ensure unbiased results.

Through careful observation and measurement, researchers collect data on how the independent variables influence the dependent variable. The experimental method allows researchers to establish causal relationships between variables, providing valuable insights into the effects of specific interventions or treatments.

In an experiment, a researcher assigns a treatment and observes the response. Sometimes, a control group (a group receiving no treatment or a placebo) may be used to compare the effectiveness of a treatment. The process of designing an experiment for collecting data is called **design of experiments**.

Factors For Designing Experiments

Time - We need to make sure the experiment can be designed and implemented within a reasonable period of time. For example, suppose the customer service department of a certain organization is experiencing exponential growth in the number of calls, and long call center wait times. The organization can design surveys in which employees and customers can participate. This has to be done

in a prompt and timely manner so that data collected could be analyzed and used for data-driven decision making that could help improve the customer service experience. If the design of the experiment and analysis of data collected is not executed in a timely manner, it could negatively impact sales and profits.

Quantity of Data **-** In designing experiments, we need to make sure the data collected from the experiment will be sufficient for us to answer the questions we need to. The amount of data (sample data) collected has to be small compared to the total expected data (population data), otherwise it would take too long to collect. The sample data must be representative of the whole population. For example, an experiment designed to study the efficacy of a medication should be demographically representative (should include different age groups, gender, ethnicity, etc.)

Determine Important Features **-** In designing experiments for data collection, you need to decide what your dependent variables or predictor variables are. It is important to understand the important features and control features.

Cost **-** Designing an experiment for collecting data can be very costly. Executing the experiment can also involve cost. For example, participants engaging in a survey could be compensated as an incentive to encourage participation. Also, data scientists and data analysts will have to be compensated for analyzing the data collected from the survey. It is important that before designing an experiment,

you estimate what the cost of executing the experiment would be, and if the benefits from the experiment outweigh the risk. For instance, if the results from the survey can improve customer experience and increase profits, then the investment would be worthwhile.

References -

- https://www.questionpro.com/blog/data-collection-methods/
- https://www.egyankosh.ac.in/bitstream/123456789/11231/1/Unit-10.pdf
- https://www.scribbr.com/methodology/questionnaire/#:~:text=A%20questionnaire%20is%20a%20list,the%20social%20and%20health%20sciences.
- https://www.surveymonkey.com/mp/how-to-collect-data-with-surveys-2/
- https://www.math.utah.edu/~anna/Sum12/LessonPlans/Section13.pdf